CALIFORNIA

ITS PRODUCTS
RESOURCES

WHAT IT OFFERS
THE IMMIGRANT,
HOMESEEKER,
INVESTOR AND
TOURIST

INDUSTRIES AND
ATTRACTIONS

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CALIFORNIA

Its Products, Resources, Industries and Attractions.

HISTORICAL SKETCH.

Many and diverse are the elements which have gone into the making of the "Golden State." Strangely different actors have played their part and left their impress. The country itself and its aboriginal inhabitants were long a source of attraction to the Spanish conquerors. In 1536, Cortes and his followers superficially inspected Lower California. They likened the land to the famous island of Amazons, described in the old Spanish romance, "Sergas de Espladian," in which the author speaks of "the great island of California, where an abundance of gold and precious stones is found." With the inherent poesy of the Spanish race they named the territory California.

In 1542, Cabrillo sailed along the coast, and over a century later Viscaino explored it, mapping the bays of San Diego and Monterey. Sir Francis Drake, Queen Elizabeth's daring buccaneer, in cruising the Pacific for Spain's treasure ships, discovered, in 1579, the bay which bears his name. He called the land "New Albion."

Spain's desire for new possessions and the missionary zeal of the Franciscans under the leadership of Father Junipero Serra led to the colonization of California in 1768. This fervid religious enthusiast, and Jose Galvez, visitador-general to Mexico from Spain, fitted out four expeditions which set out by land and sea. The vicissitudes of travel were many. Finally, the travelers reached San Diego, and on July 16, 1769, they founded the mission of that name. Despite their exhausted condition, a detachment was sent northward to find the bay of Monterey, which had been mapped out by Viscaino. It was this party that missed its objective point and found instead the important bay of San Francisco. This discovery led to the establishment of the mission of San Francisco. in the year our national independence was declared.

By the end of 1823, when the last and most northerly mission had been planted at Sonoma, these religious houses had grown to twenty-one in number and had acquired great wealth in olive, orange and grape plantations and herds of cattle and horses. The Indians were converted to Christianity, weaned from their barbaric and nomadic state, and induced to lead a settled life. The Spanish government established a presidio, or military station, near each mission. The pueblos, also a sort of adjunct to the missions, were towns established to promote the settlement of the country. They maintained local and civil government independent of church or military rule. To Californians of the present day, the missions are memorials of the older civilization which keep alive the continuity of historic interest. The ruined buildings are a source of inspiration to artists and the motif for much of the domestic, civic and religious architecture of modern California.

As the years rolled on, explorers of different nationalities now and again touched at points along the coast, but only the Russians established a settlement, which, however, was abandoned after a short period.

The political status was much altered when, in 1822, the many revolutionary upheavals in Mexico culminated in her proclamation of independence from Spain. The new republican government was unfavorable to the Church, and the Mexican congress enacted a law providing for the dispersion of the Franciscan fathers of California and a division of their vast principalities among the settlers and the Indians. Soon after this the secularization of the missions began. They were stripped of their wealth; the buildings were neglected, the Indians scattered, and the ownership of the land fell to the lot of the Mexican rancheros. These were mostly of Spanish lineage, whose principal occupation was the raising of cattle for hides and tallow. They were, on the whole, a simple, kindly and unprogressive people, much given to picturesque apparel, gay colors and fiestas. They rode a great deal, visited one another frequently, enjoyed many sports, music and dancing, lived to a ripe old age, and had very large families. These were the days of boundless hospitality, when every stranger was welcome at the haciendas and became a guest for as long as he chose to remain. Those patriarchal times of the "idle forties"—how they vanished upon the advent of the gringo—the stranger from across the plains!

By 1846 a number of Americans had found their way to the new territory. They had come as trappers and traders, and were men of valor and sturdiness—the heralds of Anglo-Saxon supremacy. A spirit of local independence developed rapidly among them. This led to jealousy of Mexican control and bitter political feuds between rival factions around Monterey in the north and Los Angeles in the south.

About this time the attention of the United States Government began to be strongly attracted toward California, and the French and the

English were looking in this direction with a view to possibly taking possession of the country.

All the circumstances connected with the seizing of California will probably never be known. It appears, however, that the authorities at Washington, having determined on a war with Mexico, and being fully aware of the importance to the United States of an extension of territory to the Pacific, resolved to take possession of California, so that after the termination of the war this country would become a part of the Union. At all events, Fremont, while engaged in conducting a scientific expedition on the Pacific coast, received in May, 1846, verbal instructions from an officer dispatched from Washington. He at once made his way to Sutter's Fort, then to Sonoma, where he organized a battalion of mounted riflemen and prepared to make war against the Mexicans. On the 14th of June, 1846, a party of Americans took possession of the town of Sonoma and raised the Bear Flag. On the 5th of July following, this Bear Flag party declared their independence, made Fremont governor and issued a formal declaration of war. Two days afterwards Commodore Sloat, under orders from the United States Government, seized Monterey, and Captain Montgomery raised the American flag in San Francisco. The conquest was completed by Commodore Stockton and General Kearny. By the treaty with Mexico in 1848, California became American territory.

Upon its acquisition, United States revenue laws were extended over the territory and San Francisco made a port of entry, but no further progress was made toward creating a government. The discussion as to what should be done with California began in Congress in 1846, and the question of slavery or no slavery was at once raised. When it became American territory the question of its admission into the Union was counted as one of supreme importance. There were fifteen free states and fifteen slave states, which resulted in an equal division of power in the Senate. The addition of the sixteenth free state would turn the scale and mark the beginning of a preponderance of free-state power in Congress. Against this, resistance on the part of the South was almost desperate. A furious conflict was waged between the oratorical giants of Congress, but nothing concluded.

The dilatoriness was most harassing to Californians, who soon realized that a state organization was the plan best calculated to supply a government to the embryo commonwealth. In accordance with this conviction the people, in 1849, framed a constitution which forbade slavery. On the 9th of September of the following year, without having gone through any novitiate as a territory, California sprang into full being as a commonwealth and was admitted to the sisterhood of states.

An important era dates from the discovery of gold at Sutter's mill, on January 24, 1848. The news that gold had been found sped to the

most distant parts of the world. A great tide of migration swept westward, and the vast Pacific was covered with the sailing craft of all nations. That historic body of gold-seekers—the Argonauts—arrived in 1849. Many of these journeyed with ox teams across the plains and struggled through the Sierras, braving the famine and horror of the desert and the perils of predatory Indians. Women and children shared with men the privations of the overland trail. Simultaneous with the coming of the overland contingent, ships were fitted out for the long voyage around Cape Horn, and steamers were put on to carry people by way of Panama. The majority of the newcomers were young, unmarried men of brawn and vigor, contemptuous of obstacles and reckless of life. They had the qualities which made them fit to do battle with and to overcome wild man and nature. They came with one idea—to get rich quickly and return home. The scramble for gold lasted until the mountains and gulches had been scratched over and a decline in gold production had set in. Then those who came to mine remained to till. The pick and the shovel gave way to the plow and the hoe. Instead of golden nuggets, the earth was made to yield a harvest of golden grain. This was the beginning of the great wheat-planting era, before the versatility of California's soil had been demonstrated. The completion of the transcontinental railroad in 1869 furthered the prosperity of the State and gave an impetus to the immigration of home-builders.

California's second "gold" discovery—the navel orange—dates from the seventies. Like Marshall's find, it was the magnet to draw to the State thousands of strangers. These, unlike the first-comers, were colonists who brought with them their household goods and set up their homes, laid out orange groves, and awaited results.

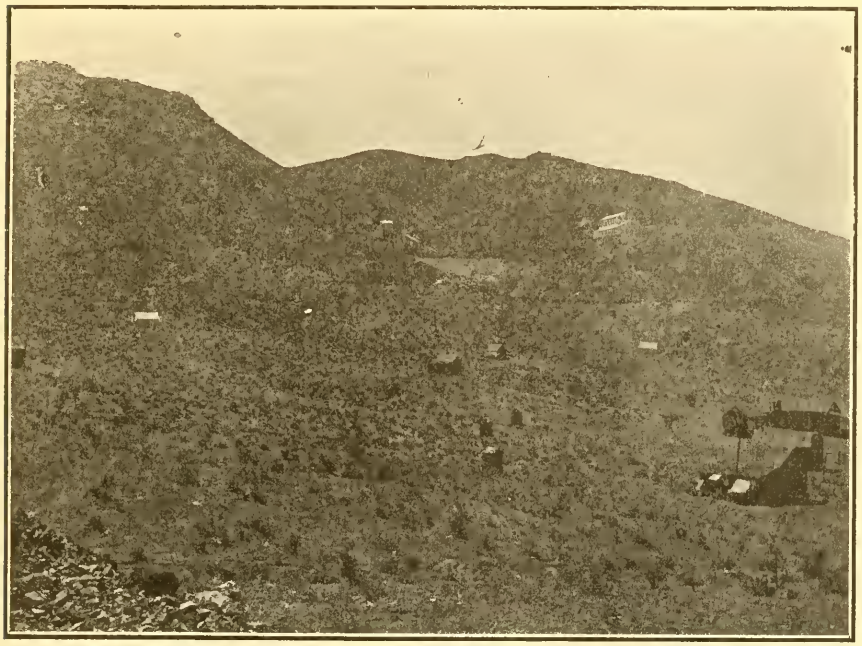
The orange was the incentive to other horticultural discoveries, and to-day California has no equal among the states, nor indeed, among the countries of the world, in horticultural possibilities. It has more acres in grapes than New England has in corn, and it produces more wine than all the rest of the Union put together. Its beet sugar is a formidable rival to the cane product of tropic lands. It exports raisins to Spain, prunes to Germany and France, and will soon take the fig trade of the world from Smyrna.

In comparison with the other states of the Union, California ranks second in area, twenty-first in population, and eighteenth in order of admission. Its coast line, measured in all its sinuosities, is nearly one thousand miles in length, and its eastern boundary conforms to the curve of the seacoast, so that its breadth is approximately the same throughout, averaging about two hundred miles. The total land area is 155,980 square miles.

TOPOGRAPHY.

By J. A. FILCHER,
California Commissioner to the Alaska-Yukon-Pacific Exposition.

In its topography California is distinct and striking. Two ranges of mountains practically inclose a great interior basin or valley. On the east is the high Sierra range, on the summits of which snow remains all the year; on the west is the low Coast Range, which gathers snow enough occasionally during the winter months to whiten its highest



YELLOW ASTER GOLD MINE, RANDSBURG, KERN COUNTY.

points a few days at a time. These mountain ranges converge at Mount Shasta in the north, and again at Tehachapi in the south. The great valley lying between them is one expanse of practically level territory, from 500 to 600 miles long and from 40 to 60 miles wide. The northern portion is drained by the Sacramento River and its tributaries, and is called the Sacramento Valley. The southern portion is drained by the San Joaquin River and its tributaries, and is called the San Joaquin Valley. These rivers empty into San Francisco Bay, and the

MOUNT SHASTA.

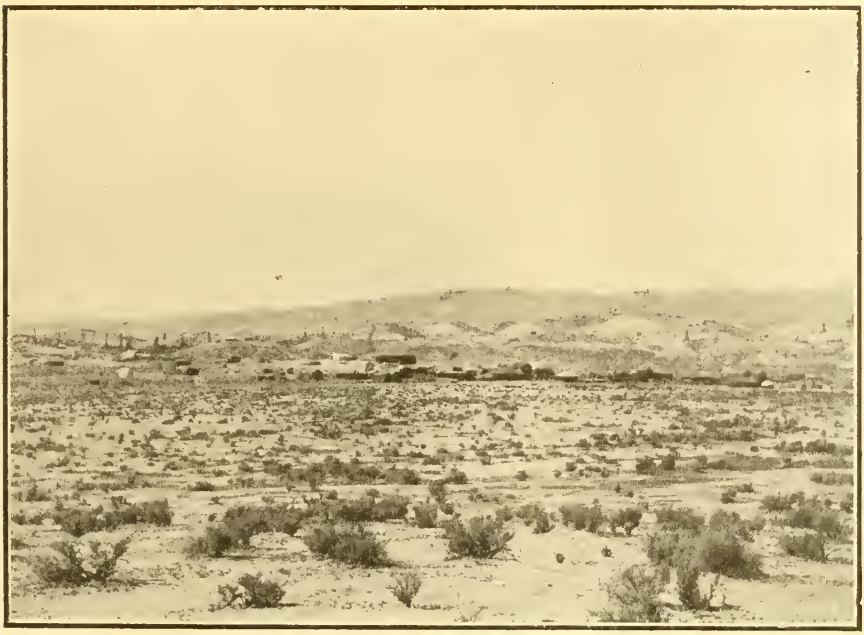
THE MEADOWS, YOSEMITE VALLEY.

Golden Gate is their common outlet to the sea. The eastern boundary line of the State follows closely the summit of the Sierras, and on the western or California side the decline is very gradual, forming an immense watershed, embracing the gold mining region of the State, vast forests of superior commercial timber, and in the lower altitudes, where less rugged, the great Sierra foothill fruit belt.

VERNAL FALLS, YOSEMITE VALLEY.

The Coast Range consists of different spurs, and between these are valleys of greater or less dimensions that are exceedingly fertile. Among the most noted of these valleys north of San Francisco Bay are Sonoma Valley, Napa Valley, Vaca Valley, and Ukiah Valley. Near Clear Lake is what is known as Scott's Valley, very productive, but of higher altitude. South of San Francisco Bay, not counting the many small and very fertile valleys in Contra Costa and Alameda counties, are Santa

Clara Valley, Pajaro Valley, Salinas Valley, Santa Maria Valley, and several other extremely rich but smaller valleys in San Luis Obispo and northern Santa Barbara counties. South of the Tehachapi range, which terminates the great San Joaquin Valley, is what is commonly known as Southern California. This part of the State is more or less broken by low mountains, but the region between them and the seacoast is extensive, and this and the valleys lying between the different mountain ranges are noted for a bountiful yield of every semi-tropic and other product that has helped to make California famous.



TOWN AND SOME OF THE OIL WELLS OF McKITTRICK OIL FIELDS, KERN COUNTY.

Back of the mountains in Southern California lies the Mojave desert. On this desert, where water has been developed, plant products have proven profitable; otherwise it presents to the eye a great expanse of unbroken sterility. This desert and the mountains that are too steep for cultivation embrace about 60,000,000 acres, or three fifths of the total area of the State, leaving about 40,000,000 acres, or two fifths of the area of the State, that is arable. Thus is the topography of California briefly outlined.

The coast trend of the State being northwest and southeast, presents a right angle front to the Japan or equatorial current that ever comes up from the southwest to lave its shores. It is this warm current that

ON EEL RIVER, ABOVE SCOTIA.

VIEW FROM MOUNT TAMALPAIS.

gives California its temperate and equable climate, and it is this current that gives to the entire State, north, south, and central, the same general average temperature at points of the same altitude and the same distance from the sea.

It is the topography of California that diversifies its climate more than latitude. Mountain ranges afford different altitudes, and altitude

MARIPOSA BIG TREE GROVE.

affects temperature. These same ranges govern the air currents, and these again have a bearing on the climate. On the coast, where the summer sea breezes are ever present, the temperature is greatly modified, and the atmosphere is refreshing. By reason of the cooler summers on the coast, the seasons are more backward. It is in the warmer vales on the eastern or valley side of the Coast Range, or on the sunny slopes of the Sierra foothills, above the fogs and below the snow, and in the

sheltered valleys of the south, that the earliest of California's products are grown. The entire Sacramento and San Joaquin valleys, being sheltered from sea breezes by the Coast Range, present an early field, but not so early as the foothills of the Sierra, or the sheltered vales of Central or Southern California. These facts are mentioned as interesting to the prospective producer, since the earliest fruits and vegetables are generally the most profitable. In this connection it may be stated that a new mark (or date) for California's earliest fruits is

THE WHALEBACK, CLOUDY CANYON TRAIL TO KERN CANYON.

promised by the products from the irrigated desert, which are becoming gradually more extensive.

Enough of the sea breezes blow through the Golden Gate to affect the temperature of the great interior valleys by evening, and it is this influence which gives to them the delightful characteristic of cool summer nights. While the soils of the valleys and sloping hills are generally rich in the elements that go to make plant life, in some portions the soil is richer and more productive than in others. These differences, as well as the air currents that affect the temperature, have their bearing on vegetation, and especially on the fruit of the plant, and they are subjects that have to be studied by the farmer and the horticulturist.

Temperature and soil elements affect not only production, but espe-

cially the quality of the product, and they must be considered by the producer. A luscious grape, for instance, can be grown almost anywhere below a certain altitude in California; but the grape of the warm interior would have too much sugar for a light dry table wine, while the grape of the cooler bay counties would not have sugar enough for a good raisin. Hence we must grow our dry wines in the cool bay counties and our sweet wines and raisins in the warmer interior. Dry, warm weather is essential also for successfully curing raisins, and hence Fresno and adjoining counties in the heart of the great San Joaquin Valley, where soil and climate conditions are ideal, have become the great raisin center of the State. Again, with the Tokay table grape color is an essential selling quality; it is, therefore, important to plant these grapes where there is plenty of iron or coloring matter in the soil. This is also true of peaches. For this reason the red iron soil of the Sierra foothills region is commanding attention as the field for the production of the best of these products.

These are instances, but they serve to suggest caution in the selection of locality for any particular production. Prunes grow to large size and are generally successful throughout the great interior orchard sections of the State; but the best prunes, those which in thinness of skin, smallness of pit, texture of flesh and delicacy of flavor come nearest the ideal, are grown in the valleys of the Coast Range. Thus, Santa Clara Valley enjoys more fame from its prunes than has the county by reason of its possession of the Lick Obervatory or the Stanford University.

Again, the foothills, so well adapted to peaches, table grapes, pears and certain varieties of plums, are not the best place for apricots. This fruit requires a deep, rich loam, and hence the river bottom land of the interior valleys and the deep, dark soil of the Coast Range valleys and around San Francisco Bay can be depended on for the thriftiest trees and the best crops. Citrus fruits require a deep, rich soil and a congenial climate, warm in the summer and not too cold in the winter. The winter in San Francisco would not hurt an orange tree, yet the summer is too cool for the proper development of the fruit; hence San Francisco and adjacent coast country are not practically within the California citrus belt.

Nearly all the arable regions of Southern California have conditions favorable to citrus fruit production, and it is here nearly all the oranges and lemons are at present grown, yet the Sierra foothills and the San Joaquin and Sacramento valleys, where soil conditions are favorable, are extending their groves and adding each year to their output of this staple California fruit.

It is said the olive will grow anywhere, even on impoverished soil,

but experience has shown that, like all other fruit, it appreciates good soil, and responds generously to good care.

There is much in soil and temperature in California and the adaptability of certain conditions for the best results in certain lines of products which the oldest or wisest inhabitant has not yet satisfactorily solved; but enough is known, as the result of extensive and expensive experiments, to suggest to the novice, or the newcomer, that he must exercise care in selecting a location for the pursuit of any particular line of husbandry. He may do fairly well in almost any line, almost anywhere, but what he should endeavor to learn is the locality in which he can do better in his particular line than he could do elsewhere. Ask questions, observe what others are doing, and make comparisons—this is the quickest, easiest, and safest way to learn the truth.

CLIMATE.

By HON. N. P. CHIPMAN,
Justice of the Appellate Court.

California's most valued asset is her climate. Herein lies the chief reason for her world-wide fame. Other states have rich lands, extensive forests, great mineral wealth, navigable waters by sea and by river, and are blessed with picturesque and notable mountain scenery, in all of which respects California stands preëminent; but if we take from California her climate and substitute for it that of the country lying to the east of the Sierras, the State would at once lose its distinguishing characteristic, its unique feature and its highest claim to superiority. I may in the strongest possible way give emphasis to the fact that nowhere else on the American continent are such remarkable conditions to be found. If we cross the Siskiyou Mountains northward, or the Sierras into Nevada, or journey into Arizona or New Mexico, we pass out of the zone which, through climatic influences, nature has set apart in a class by itself.

The more one studies the climatology of California, the more will he become convinced that its climate is of exceptional diversity and peculiarity. He will find, too, a fact so difficult to force upon the Eastern mind—that the valleys and coast of the northern, central and southern portions of the State possess substantially the same climate, viewed from an economic standpoint. That is to say, that substantially the same agricultural and horticultural products are found in latitudes seven hundred miles apart.

The rainfall diminishes usually as we go south and increases as we ascend the mountains. The temperature of the interior points in the south differs but little (about one degree) from the mean in the interior valleys of the northern and central counties.

The highest and lowest temperatures are closely similar. A most striking illustration is found in Placer County. At Summit, there were (in 1907) over 66 inches of rainfall with 594 inches (49 feet) of snow, while at Rocklin, in the same county, there was no snow, 52.44 inches of rain, and the lowest temperature was 27 degrees above zero. Some very thrifty orange groves are around Rocklin. It is but two or three hours by rail from the point where our supply of natural ice is gathered to Auburn, Newcastle and Rocklin, whence some of our earliest fruits go to Eastern markets.

Much the same comparative temperatures and conditions exist along the coast, although the coast climate softens and is more equable as we go south. Santa Barbara, Los Angeles, and San Diego. for example, are mild and delightful. The trade winds in summer are harsher along the northern coast and fogs are more frequent than along the southern coast. A compensating economic advantage is found in the greater rainfall and in the much longer continued and more luxuriant growth of natural grasses along the north coast.

The lowest temperature recorded at any station in the State is 16 degrees below zero at Tamarack (Alpine County), elevation 8,000 feet. At but few stations in the Sacramento and San Joaquin valleys, along the coast or in Southern California is any snowfall recorded. The valleys of the interior occasionally have high temperatures, but the dryness of the atmosphere makes this less objectionable than an 85-degree temperature would be in the humid atmosphere of the Eastern States. The warm, dry air of the valleys favors early fruitage and rapid vegetable growth. The terms "winter" and "summer," as used elsewhere, have no application here; more properly the year is divided into "rainy season" (winter, November to April) and "dry season" (summer, rainless). Latitude signifies but little in determining the readings of the thermometer and this is a peculiarity not found in corresponding latitudes in Europe or on the Atlantic coast in this country. This is proven by the fact that oranges are grown as far north as Shasta County. Orange groves flourish in Butte County, 650 miles north of Los Angeles. I mention oranges only among our fruits, because the mind naturally associates the orange with a semi-tropic climate, and is willing to accept it as proof that where it grows must necessarily be a climate of exceptional mildness.

A peculiarity of the climate of California, and at the same time an evidence of its economic value, is the fact that on the same land in many parts of the great valley region we can grow the cereals and grasses and nearly every commercial fruit found in the State, and this is not true of any part of Italy or of any country around the Mediterranean. I do not say that it would be a necessary use of a single piece of land to devote it to so many different products, for even here we must study the better adaptation of land to particular uses; but as an evidence of the marvelous climate given us it is possible to grow almost every fruit to be found from the Baltic to the south of Italy and Spain on the same tract of land.

Perhaps no single feature of California's climate is so closely associated with the production of wealth as that in the field, orchard, garden, factory, forest or mines, where every day may be a day of productive labor. Our farming and orchard activities never cease throughout the year, and rarely is there a day too inclement for comfortable work.

Then, too, not only may man find profitable employment each day, but Nature is at work uninterruptedly if aided by irrigation of the land. Our so-called winter months are months of active plant growth, and summer is a still more active period of growth, when the lack of rainfall is artificially supplied. There are many other economic advantages that must suggest themselves to the thoughtful and practical mind. Not least, the cost of living, where freezing weather is so rare and less clothing and less fuel are required.

We have reliable statistics reaching back over half a century, and beyond that the traditions of the country connecting the present period with the early Mission Fathers. No change in climate has been observed aside from the seasonable variations—no permanent change has occurred in rainfall or temperature. The natural conditions surrounding the State are immutable; these have established the law governing climate, and this latter must also ever be unchanging.

It is a fact that California is an almost universal sanitarium. Of course local conditions, themselves removable, produce sickness in particular places, but it is common experience that persons coming into almost any part of the State increase in weight and strength. Insomnia and nervous affections find alleviation here. Sunstroke is unknown. The coast climate is invigorating, stimulating and delightful. Some discomfort is experienced in the harvest field in the interior, but not so great as in climates of greater humidity.

The great diversity of climate and the unique climatic conditions existing in the mountains, valleys and along the coast—to which may be added the scenic beauty of the landscape—give to life in California an indescribable charm. There is scarcely a farm home in all the valley regions of the State that does not look out upon great ranges of majestic mountains, more or less distant. The floral beauty of the uncultivated lands and the delightfully variegated landscape spread out before him are, to the farmer, a source of constant delight if he has any love for the beautiful in his nature. He may also go to the mountains or to the coast and enjoy an entire change of climate and pleasurable occupations in a few hours or a day. I have often thought how greatly blessed is he when compared with his brother on the monotonous plains of the great West, where the sun rises and sets in a nearby horizon, on a dead line with all the land around him. There is in California a joy in the mere living that compensates the loss of the pleasures which may be conceded to surround persons residing in States and countries of more advanced civilization than we at present, perhaps, enjoy.

THE TRIUMPH OF IRRIGATION.

By WILLIAM E. SMYTHE,

Author of "The Conquest of Arid America."

First of all, irrigation is not a substitute for rain. Rain is a substitute for irrigation, and a very poor one. Irrigation is an insurance policy on the crops. But it is far more. Irrigation is the mother of institutions!

An ideal place would be one where it never rains in the growing season, but where the genius of man, working in coöperation with favorable natural conditions, could direct the moisture just where and when it is needed, in accordance with the varying needs of different crops. This ideal condition is approximated in a large part of the arid region, including the major portion of California.

The most striking effect of this ancient art, which has now become the inspiration of remarkable modern developments, is its social influence. In this respect it revolutionizes the character of rural life. For irrigation means small farms; small farms mean near neighbors; and near neighbors imply high social advantages. The best examples of irrigation communities combine the most attractive features of town and country life. They give at the same time the benefits of neighborhood association and the independence that comes from living on the soil. The result is a high degree of equality such as is seldom realized elsewhere. In many a California colony the homes are as beautiful as in the famous suburbs of Boston and Philadelphia, and these beautiful homes belong to the many, while those in the suburbs of great Eastern cities represent the few who have succeeded better than the average.

Irrigation is the great teacher of coöperation. Men are compelled to associate and organize in distributing water over their lands. From this experience it is easy to go forward to similar association in the sale of their products and the purchase of their supplies. For they soon learn that it is better to work with and for each other than against each other. This form of economic development is yet in its infancy, but is destined to extend in all directions and to have a very important influence on the future civilization of the irrigated region.

The artificial control of moisture supplies the basis of absolutely scientific agriculture. The element of chance is wholly eliminated. Man asserts his control over the forces of nature. Among other desirable results, he gains the power of diversifying his crops to the utmost degree and thus becoming self-sufficient. With him, the rain does not fall upon the just and the unjust—that is to say, upon crops that need it and crops that do not need it. The strawberry vines may call for moisture in their own unmistakable language, and the call is promptly answered. The sugar-beets may crave only the uninterrupted sunshine in order that they may pack the largest possible amount of

AN IRRIGATION CANAL—ORANGE GROVES AT THE LEFT.

saccharine matter in their tiny cells, and the water is allowed to go singing past them. Thus, individuals and communities may become independent. National prosperity may pass and hard times come in its place, but the man who has a few acres of irrigated soil will continue to collect his living so long as water runs down hill and Mother Earth yields her increase.

The most famous spots in California were evoked from desert or sheep-pasture by the miracle of irrigation. It does not follow that all parts of the State are worthless for agriculture or horticulture without it. But it is true, as Major John W. Powell said years ago, that "there is probably no acre of land in the United States the productive capacity of which would not be at least doubled by scientific irrigation." This is emphatically true of California, and the industry is being gradually extended into many localities which once proudly advertised that "no irrigation is needed."

To those who are unfamiliar with it the actual process of irrigation seems a deep mystery. They regard it as an effort to overturn the laws of nature. The truth is that it is a perfectly natural process. The man who waters his plat of grass, and the woman who waters her dooryard pansies, are irrigators in a humble way. The citizen who grumbles at the sight of withered lawns in a public park during a dry summer yearns for irrigation without knowing it.

The control of water for irrigation presents about the same problems to the engineer as the control of water for domestic purposes in large cities and towns. The water must be diverted from a flowing stream at a level high enough to command the territory to be irrigated; or it must be impounded in reservoirs at a season of floods or unusual flow, such as occurs everywhere when the ice and snow are melting; or it must be sought in the bowels of the earth by means of wells and lifted to the surface by pumps, except in the case of artesian waters, which flow out of the mouth of the well by reason of their own pressure.

The principal difference between securing a supply for domestic and for agricultural purposes is that in the case of the former the water must be as pure as possible, while in the case of the latter the impurities which gather in ponds and streams have a distinct commercial value as fertilizers. The sewage of Paris is used for irrigation purposes with wonderful results, and the same thing is done in several Western cities, including Los Angeles.

Irrigation works range from rude and simple ditches, taking their supplies from mountain brooks where the water has been diverted by means of small brush dams, to great masonry walls which block the outlet of deep canyons, holding back the water, which is thence transported through pipes, flumes and cemented ditches to rich lands miles away. In the one case the works have been constructed by a small association of farmers, using their own labor and teams; in the other, millions of Eastern and foreign capital have been invested. In both cases water is led through main canals to central points in the territory to be reclaimed. These mains are of all sizes, depending entirely upon the volume of water required. From the mains lateral ditches reach out in various directions. The farmer taps the lateral with a shallow ditch, usually made with a plow, and thus conducts the water where

he wants it through his own private system of distributers. The management of the water, when the system has once been perfected, is so simple that a child can attend to it.

In the hands of the Indians and Mexicans of the southwest irrigation was a stagnant art, but the white population studied it with the same enthusiasm it bestowed upon electricity and new mining processes. The lower races merely knew that if crops were expected to grow on dry land they must be artifically watered. They proceeded to pour on the water by the rudest method. The Anglo-Saxon demanded to know why crops required water, and when it could be best supplied to meet their diverse needs.

The earliest method of irrigation is known as "flooding," and is usually applied by means of shallow basins. A plot of ground near the river or ditch from which water is to be drawn is inclosed by low embankments called checks. These checks are multiplied until the whole field is covered. The water is then drawn to the highest basin, permitted to stand until the land is thoroughly soaked, and then drawn off by way of a small gate into the next basin. This process is repeated until the entire field is irrigated. This is the system practiced on the Nile, where the basins sometimes cover several square miles each, while in the West they are often no more than four hundred feet square.

There is both a crude and a skillful way to accomplish the operation of flooding, and there is a wide difference in the results obtained by the two methods. Indian and Mexican irrigators seldom attempt to grade the surface of the ground. They permit water to remain in stagnant pools where there are depressions, while high places stand out as dusty islands for generations. All except very sandy soils bake in the hot sunshine after being flooded, and the crude way to remedy the matter is to turn on more water. Water in excess is an injury, and both the soil and the crops resent this method of treatment.

The skillful irrigator grades the soil to an even slope of about one inch to every hundred inches, filling depressions and leveling high places. He "rushes" the water over the plot as rapidly as possible and, when the ground has dried sufficiently, cultivates the soil thoroughly, thus allowing the air to penetrate it. The best irrigators have abandoned the check system altogether and invented better methods of flooding, the crops. Cereals and grasses must always be irrigated by flooding, but the check system seems likely to remain only in localities where Spanish speech and traditions survive. Flooding is now more generally accomplished by means of shallow indentations or creases, which are not as large as furrows, but serve the same purpose. These are made by a simple implement at intervals of about twelve inches. They effect a very thorough and even wetting of the ground.

The scientific side of irrigation is to be studied in connection with the cultivation of fruits and vegetables rather than with field crops. It is here that the English-speaking irrigators of California produced their best results. The ideal climatic conditions attracted both wealth and intelligence into the irrigation industry. Scarcity of water and high land values promoted the study of the best methods. Where water is abundant it is carried in open ditches and little thought is given to loss by seepage and evaporation. Under such conditions water

is lavishly used, frequently to the injury rather than to the benefit of crops. But there are parts of California where water is as gold and is sought for in mountain tunnels and in the beds of streams. A thing so dearly obtained is not to be carelessly wasted before it reaches the place of use. Hence, steep and narrow ditches cemented on the bottom, or steel pipes and wooden flumes, are employed.

The precious water is applied to the soil by means of small furrows run between the trees or rows of vegetables. The ground has first been evenly graded on the face of each slope. The aim of the skillful irrigator is to allow the water to saturate the ground evenly in each direction, so as to reach the roots of the tree or plant. The stream is small, and creeps slowly down the furrow to the end of the orchard, where

IRRIGATION DITCH—LINED WITH CEMENT.

any surplus is absorbed by a strip of alfalfa, acting like a sponge. The land is kept thoroughly cultivated. In the best orchards no weed or spear of grass is ever seen, for water is too costly to waste in the nourishment of weeds. Moreover, it is desired to leave the soil open to the action of air and sunshine. Nowhere in the world is so much care given to the aëration of the soil as in the irrigated orchards and gardens of California. Too much water reduces the temperature of the soil, sometimes develops hardpan and, more frequently, brings alkali to the surface. For these reasons, modern science has enforced the economical use of water, reversing the Mexican custom of prodigal wastefulness.

Of late years the application of water by furrows has been brought to a marvelous degree of perfection. What is known as the "Redlands system" is the best type of irrigation method known in the world.

Under this system a small wooden flume or box is placed at head of the orchard. An opening is made opposite each furrow and through this the water flows in the desired quantity, being operated by a small gate or slide. The aperture regulates the flow of water accurately and the system is so simple that, after it is once adjusted, it is as easy as the turning of a faucet. The farmer who grows his crops on a fertile soil, under almost cloudless skies, with a system controlling the moisture as effective as this, may be said to have mastered the forces of nature.

The quality of the fruit has improved immensely since the California methods were perfected. Every fruit-grower realizes that the profit in his business comes mostly from the first grade of fruit. Scientific irrigation makes it possible for him largely to increase the percentage

IRRIGATING PRUNE ORCHARD—TREES IN BLOOM.

of the best fruit, and the difference which this produces in the earning capacity of his acres is surprising.

The Mission Fathers gave the natives their first lessons in the art of irrigation, and the beautiful gardens and orchards which sprang up in the early religious communities illustrated the agricultural possibilities inherent in California soil and sunshine. But the modern era of irrigation began fifty years ago with the founding of Anaheim, some twenty miles southeast of Los Angeles, by a colony of German-Americans. Anaheim is rightfully proud of its distinction as the mother colony.

Far more widely celebrated, however, are Riverside and the numerous settlements which came into being as the consequence of its example and influence. Among these are Ontario, Pomona, Etiwanda, Corona, Redlands and many others. These famous communities represent the

maximum achievement in home-building on irrigated lands, and have no real rivals in any part of the world, so far as skill in the application of water and beauty of public and private improvements are concerned. All that was said at the beginning of this article about the peculiar social and economic advantages arising from scientific control of moisture is strikingly illustrated in scores of Southern California communities.

The streams in this part of the State are wholly of torrential character, and during the larger portion of the year present nothing but dry channels over most of their courses. But during the rainy season they are often roaring rivers for a few days at a time, while a considerable flow is maintained by the melting snows much later. The canals

FLOODING THE ORCHARD—WATER-TENDER AT WORK.

first built upon these streams obtain most of their supply from the surface flow, but later canals depend upon the water which has been caught and held in storage reservoirs or upon that obtained from deep wells, some of which are of true artesian character and flow by means of their own pressure. The hunt for water goes on relentlessly from year to year, for it is the foundation of all values in this arid land. What individuals may do alone, or small farming communities by means of coöperation, has been largely done. What is now to be accomplished by the hand of united and associated man we shall shortly see.

Although Southern California was first to utilize irrigation, this is by no means the largest field of the industry. The beautiful southern counties enjoy a fame wholly out of proportion to their geographical area, which is greatly to their credit, and which is due to their success in putting water upon the land far more than to any other single factor. But it is the region north of the Pass of Tehachapi which was endowed

by nature with the greatest valleys of fertile soil and the most abundant supplies of water available for irrigation. The climate, too, is fully equal to that of the south in productive capacity. Indeed, the earliest fruit of every kind, including oranges, is grown hundreds of miles north of Los Angeles. It is difficult to convince Eastern people that this is true, because of their inherited prejudices as to the meaning of northern and southern latitudes, but it is, nevertheless, a fact beyond all dispute.

The great interior basin of California, inclosed between the Coast Range and the Sierra, extends north and south of the bay of San Francisco for hundreds of miles in either direction. The southern portion of it, known as the San Joaquin, has a number of great irrigation

IRRIGATING STRAWBERRIES.

systems, any one of which supplies more land than is irrigated in the famous valleys of Southern California. In addition to these great systems, there are many smaller ones. Perhaps the most striking development is that in the neighborhood of Fresno, which is the center of the raisin district. Here a very poor cattle country has been converted into a land of small diversified farms, sustaining a comparatively dense population.

The great valley of the Sacramento, constituting the northern half of the great interior basin, is even more abundantly watered so far as the natural supply is concerned, but is far more backward in irrigation development. This is due to the fact that rainfall is heavier and more reliable, so that crops are raised without artificial moisture. The Sacramento region is now in the stage of transition from large to small farms and irrigation is being rapidly extended in consequence.

In the beautiful coast region the same general statement is true, although the small farm unit has preceded irrigation in many localities. Certain classes of fruit are raised successfully by means of the winter rainfall, but the productive capacity of the soil is greatly enhanced by irrigation. Not only so, but irrigation makes it possible to diversify the crops to the last degree and to take full advantage of the wonderful climate by raising successive crops of small fruits and vegetables. This explains the rapid spread of the art in all portions of the State.

Besides the celebrated districts in the north and south, with which all travelers and readers are more or less familiar, there are undiscovered Californias lying away from the railroad lines and scarcely known to Californians themselves, yet full of potentialities of development. These are on the eastern slopes of the Sierra, bordering Oregon on the north, Nevada on the east, and Mexico on the south. The most promising of these districts are the Honey Lake region, the Inyo country and the vast valley of the Rio Colorado.

As a whole, it may be said that the irrigation industry of California is yet in its infancy. What has so far been done is little more than the foreshadowing of the great achievement which is to come, for something great has happened in the last two years.

Private and small coöperative enterprises have done what they could to assist California in the realization of its economic destiny. And they have done well. But the task is too great for any power short of the General Government itself to carry to a successful conclusion. It is to be the labor not of years, but of generations, even of centuries. It is to cost not millions, but tens of millions. It is to benefit not individuals and local communities alone, but states, a nation, humanity. And its dividends are to be paid, not in pecuniary terms, but in lasting institutions, in the economic freedom of the race.

The act approved June 17, 1902—the anniversary of the battle of Bunker Hill—started California on a new era of development. The money provided for the work of national irrigation is meager—the fund now amounts to something over twenty millions—but the principle established is of incalculable importance. Already national engineers are at work in making plans on two California streams for irrigation systems as great as those built by British genius on the Ganges and the Nile. These streams are the Sacramento in the north and the Colorado in the south. When these are completed the foundations will be laid for millions of new population and hundreds of millions of new taxable wealth. These systems may be made to provide not only for irrigation, but also for drainage of lands now rendered useless by annual overflow, and may also assist in the provision of facilities for navigation and for power.

The greatest single example of the triumph of irrigation in California is seen in the big region formerly known as the Colorado desert. This is the delta of the river of that name, in the extreme southeastern part of the State, extending over the border of Mexico. Here daring private enterprise has undertaken what would have been an ideal task for the Government itself—the reclamation of something like a million acres of the most fertile land in the world.

January 1, 1901, not a single white man dwelt in the region, and

even Indians were scarce. January 1, 1902, a party of a dozen surveyors had the place to themselves. January 1, 1903, two thousand settlers had arrived. January 1, 1904, there were, approximately, ten thousand people there, with several towns, a railroad, telegraph, telephone, many stores, a national bank, and with seventy thousand acres in actual cultivation. To-day it is almost a State in itself. It sounds like a tale from the Arabian Nights, but it is absolutely true. And even the truth of to-day is pale compared with the promise of to-morrow. A great river brought under human control makes all the difference between hopeless desolation and the highest forms of civilization.

California beckons to the waiting millions. By the grace of irrigation she can make room for them all, and not only make room for them, but give them a degree of social equality and economic independence such as no other land on the face of the earth was ever able to offer them. To those who want homes, who want to work for themselves, who want to provide a future for their children, *California* spells *Opportunity.*

MINING IN CALIFORNIA.

By LEWIS E. AUBURY,
State Mineralogist.

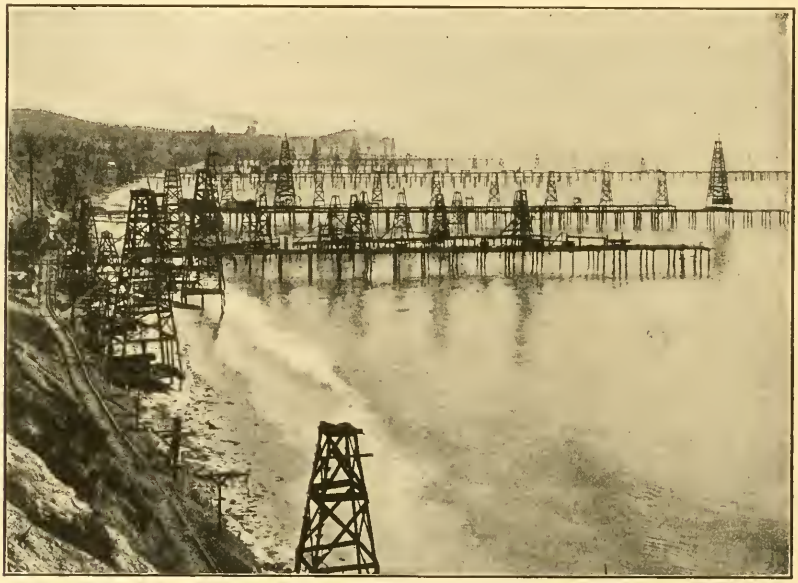
Half a hundred minerals are adding annually to the wealth of California. Discoveries, new uses, and new processes are continually widening alike the value of the mineral industry of this State. Trite as the saying may be, the truth is that the mineral resources of California are, practically, inexhaustible. Gold has passed through several productive phases, ranging from the period of the placer through the closely following era of quartz mining, the greatly productive period of hydraulic mining before it was restrained, down to the dredging period of the present.

The greatest conflagration in modern times, that which destroyed a large part of the city of San Francisco, the commercial and financial center of the State, was ineffectual to materially interfere with that progress.

The past decade has largely increased the areas wherein minerals of high value have been produced in great commercial quantities. The petroleum industry of California, reckoning by years, is, in its widely extended aspect, almost new; but it has made a great record, not only in the amount of actually discovered oil sands, but also by having an output of almost unlimited application in manufactures, power making, has been able to enhance its value per barrel in the market solely by reason of the swiftly growing demand. Out of the home production of petroleum has grown the asphalt manufacturing industry, which now engages the attention of more than a score of plants and makes an increasing showing on the favorable side of the mineral balance sheet as it is annually prepared.

A little more than a decade has brought copper forward into one of the leading items of the mineral statistics of California. A belt of large size in Shasta County has been proved to be immensely endowed with copper. Smelters costing many millions of dollars have been erected there. By night and by day they are operating. There are great copper belts in other parts of California, which have been developed less extensively than the cimetar-shaped one in Shasta, notably in Calaveras, Placer, Fresno, and San Bernardino counties. These have produced profitably. California has reached a high rank among the copper States of the Union. The next few years will make this State still more prominent in this regard.

There is hardly a county in California in which mineral substances of



OIL WELLS IN THE OCEAN, SANTA BARBARA COUNTY.

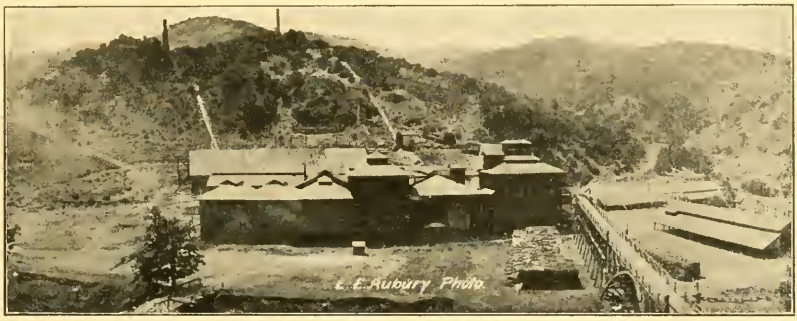
some sort are not produced, commercially and profitably. In each successive period of twelve months the claim of this State to possession of resources that could be made to support its people almost independently is made good in constantly increasing measure.

The gold output of California alone, inclusive of the year 1907, has amounted in value to $1,469,513,691. Notwithstanding this vast sum, it is safe to say that the future will demonstrate that a comparatively small beginning has been made toward exhausting the golden treasury of California. Deep quartz mines that have been operated half a century are still large and profitable producers, and are paying dividends. From the beaches of Del Norte County to the southeastern extremity of this State, which is, approximately, something like 1,000 miles, gold has been mined.

The placer period was the most productive of any to date, and there is an excellent reason for this, namely, the low cost, relatively, of work-

ing placers, and the ease with which the accumulated surface gold that had been washed down in ages was taken in hand by the early miners. But considering what the gold dredgers have proved concerning their utility and efficiency, and the fact that the rich quartz mines of depth are undoubtedly types of countless others that can and will be developed through the coöperation of capital and intelligent enterprise, the forecast of future gold output in California that will surpass that of the banner placer year need not be considered unwarranted. They who know of the actual mineral wealth of this State will be the last to question such a conclusion.

Recent operations in long neglected fields have resulted in the uncovering of large deposits of very rich ores at comparatively small depth. The discoveries of gold in the past five years include some of the richest finds in the history of California. Such instances are not confined to any county, nor to any particular latitude. In addition to the quartz mines a large advance has been made in uncovering ancient river chan-



LARGEST QUICKSILVER MINE IN THE WORLD—NEW ALMADEN.

nels, which, under their capping of lava, carry great values. The objective lesson is plain to whomsoever will take the time to comprehend, which is that invention is continually widening the possibilities for success on the part of the miner. Hydraulic mining is still profitable in places where the conditions are such as to permit operations to be conducted without interference of law. Drift mining holds its own as a source of wealth for those who are engaged in its pursuit and for the State at large. Gold dredging, which has been passing through a period of profitable evolution, contains vast possibilities.

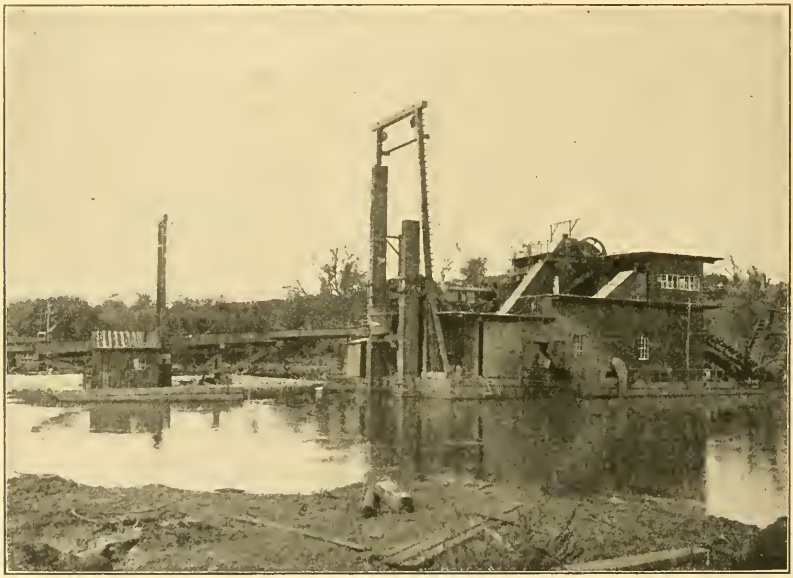
Gold dredging has been conducted mainly in large areas where the soil may be worked with comparative ease. Hidden under boulders, or in places to which the interposing boulders bar the way, there are millions of dollars' worth of gold yet to be recovered. The recent extension of gold dredging in the counties that border on the rivers of California has been a large factor in the output of the year.

A feature of the mineral development of California in the past few years, and one of great importance, has been the increase in the production of petroleum. In 1887 the total petroleum output of the State was but 678,572 barrels. Ten years later the output was 1,911,569 barrels. In 1907 petroleum production reached the large proportions of 40,311,171 barrels, valued at $16,783,943.

To convey an adequate idea of the distribution of minerals among the counties of California I have taken the following extract from a report that was sent out by the California State Mining Bureau in 1908, in connection with the statistical returns for the State for the year 1907:

"Placer County produced the asbestos. Asphalt was produced in Alameda, Contra Costa, Kern, Los Angeles, Santa Barbara, San Luis Obsipo, and San Francisco counties. The bituminous rock all came from Santa Cruz and San Luis Obispo counties.

"Borax is credited to Inyo, San Bernardino, and Ventura counties; cement to Napa, San Bernardino, and Solano counties; chrome to Calaveras and Shasta counties.



GOLD DREDGING—OROVILLE.

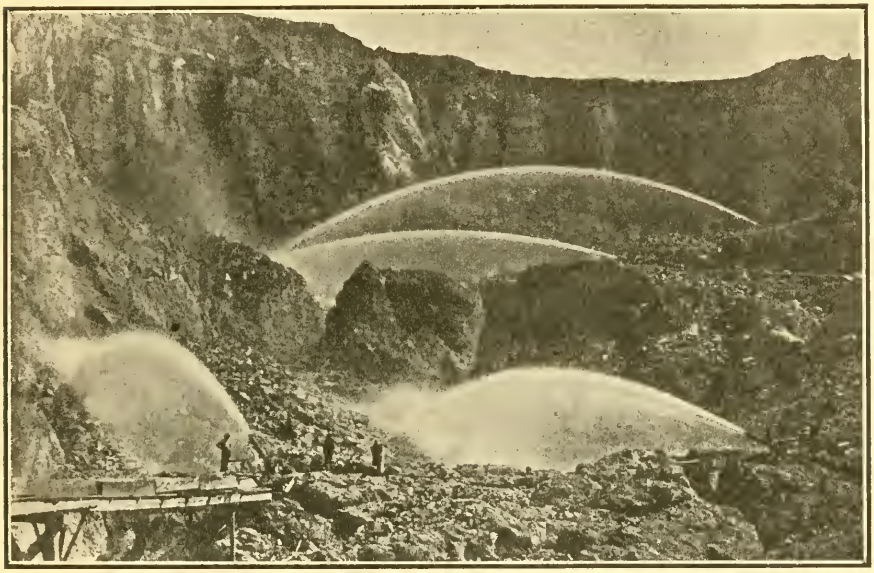
"Brick clays are utilized in Alameda, Contra Costa, Fresno, Humboldt, Imperial, Kern, Kings, Los Angeles, Marin, Merced, Madera, Mendocino, Orange, Riverside, Sonoma, Santa Clara, San Joaquin, San Mateo, San Diego, Santa Barbara, San Bernardino, Sacramento, San Francisco, San Luis Obispo, Shasta, Solano, Tehama, Tulare, and Ventura counties.

"Pottery clays are credited to Alameda, Amador, Calaveras, Los Angeles, Placer, Riverside, and Sonoma counties.

"The great bulk of copper was produced in Shasta County, the copper output of that county alone being more than 27,000,000 pounds. Calaveras produced 3,941,883 pounds. Fresno stood third in copper production, with 250,000 pounds. The other copper producing counties were Amador, El Dorado, Inyo, Los Angeles, Madera, Nevada, Orange, Riverside, San Diego, San Bernardino, and Siskiyou.

"Kings County produced Fuller's earth, San Diego, Riverside, Sonoma, and Tulare counties reported production of gems.

"Nevada, Placer, Riverside, Sacramento, San Bernardino, and San Diego counties were granite producers, and Colusa, Los Angeles, Santa Barbara, Siskiyou and Yolo yield sandstone. Some serpentine was quarried in Los Angeles County. Alameda, Colusa, Contra Costa, Los Angeles, Riverside, Sacramento, San Benito, San Bernardino, San Francisco, Santa Cruz, San Luis Obispo, San Mateo, Solano, and Sonoma are entitled to credit for the production of macadam. Marble was quarried in Inyo, Los Angeles, Riverside, San Bernardino, San Diego, and Tuolumne counties, and rubble in Alameda, Los Angeles, Marin, Napa, Placer, Riverside, San Diego, San Bernardino, Santa Barbara, Sacramento, San Francisco, Solano, and Ventura counties. Glass sand was



HYDRAULIC MINING, NEVADA COUNTY.

produced in Monterey County; paving blocks in Riverside, San Bernardino, Solano, and Sonoma.

"The sole producer of iron ore was Shasta County. Santa Barbara was alone in the production of infusorial earth. Kern, Los Angeles, and Tulare counties were gypsum producers. Madera, Mariposa, Orange, San Bernardino, Inyo, and Riverside were lead producing counties. The zinc came from Inyo and Orange counties.

"Lime or limestone were in the mineral output of Amador, El Dorado, Kern, Los Angeles, Monterey, Placer, Riverside, Santa Clara, Siskiyou, Santa Cruz, Shasta, San Luis Obispo, San Bernardino, Sonoma, San Benito, Tuolumne, Calaveras, Santa Barbara, and Plumas counties.

"Four counties brought forth magnesite, namely, Alameda, Riverside, Sonoma, and Tulare counties. Plumas alone produced manganese. Stanislaus is credited with mineral paint. Mineral waters were produced for market in the counties of Butte, Colusa, Lake, Los Angeles, Mendocino, Monterey, Napa, San Benito, Santa Barbara, San Luis

Obispo, Santa Clara, San Diego, Shasta, Sonoma, Sierra, Siskiyou, Solano, and Tehama. The natural gas producers were the counties of Sacramento, San Joaquin, Santa Barbara, Ventura, and Solano.

"The petroleum producing counties included Fresno, Kern, Los Angeles, Orange, Santa Clara, San Luis Obispo, Santa Barbara, and Ventura. Quicksilver was mined in Colusa, Lake, Napa, Santa Clara, San Benito, Santa Barbara, Solano, San Luis Obispo and Sonoma

A VENTURA OIL FIELD, BUCKHORN DISTRICT.

counties. Pyrites came from Alameda and Shasta counties. Calaveras alone produced quartz crystals.

"The salt production of the State was due to Alameda, Colusa, Los Angeles, San Diego, San Mateo, and Solano counties, the largest producer being Alameda County. All the slate was produced in El Dorado County. Tungsten is credited to Kern and San Bernardino counties.

"The counties that reported gold production are Amador, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Humboldt, Inyo, Kern,

Los Angeles, Orange, Ventura, Madera, Mariposa, Merced, Monterey, Mono, Nevada, Placer, Plumas, Riverside, Sacramento, San Bernardino, San Diego, San Luis Obispo, Shasta, Sierra, Siskiyou, Stanislaus, Trinity, Tuolumne, and Yuba. Silver was also mined in each of the gold producing counties with one exception."

Generally speaking, the foregoing is sufficient to indicate the extent of areas in which mineral substances are found in California; but it is true that the mineral fields that are utilized in the production of wealth in this State are widening their boundaries, continually. The returns for the year 1907, which are the latest complete returns now available, show that the total value of metallic substances was $24,896,483, and of nonmetallic substances $2,505,000. The total value of the hydrocarbons and gases was $18,029,937, an increase of $7,859,664; of structural materials $10,266,529, an increase of $2,407,403, as compared with the previous year. Owing to the decrease in the gold and silver output, as reported by the United States Geological Survey, and the increase in the production and value of petroleum, as ascertained by the California State Mining Bureau, petroleum, for the first time, took the leading place in the mineral production of California.

AGRICULTURE IN CALIFORNIA.

By ARTHUR R. BRIGGS,
Manager of the California State Board of Trade.

Under varied conditions, farming in California has more features of interest and presents greater opportunities than in any other State. The wide range of products and the peculiarities of soil, climate and weather afford abundant scope for the energies and experiments of the wideawake tiller of the soil. Despite the impression that prevails in states east of the Rocky Mountains, the rules under which farming is profitable elsewhere are applicable here. The stock-raiser in any other part of the United States would not be at a loss to understand the features of difference in stock-raising in California from those which obtain in the older states, and to adapt himself to them. The successful and intelligent farmer in any other state would be equally successful here, and his experience wherever gained would be as useful. If the business involves less expenditure and less care on account of more favorable conditions, this would not necessitate the unlearning of anything, nor operate against the introduction of methods that have been successfully employed in other states. This statement applies to all branches of agriculture, for the reason that farming, like any other occupation, involves a fundamental knowledge, fortified with practical experience, and the intelligence to understand the importance of adapting that knowledge and experience to different conditions.

When it is understood that California, the second state in size in the Union, has a total land area of 155,980 square miles, or 99,827,200

acres, of which 28.9 per cent, or 28,828,931 acres, were included in farms when the census of 1900 was taken, some general idea of its magnitude as a farming area is received. But no part of California has yet been developed to its capacity, either as to products or in the selection of such as are ultimately to be of the greatest profit. Intensive farming has been exemplified in several counties, but not one of them has its whole cultivable area in crops. Another consideration in estimating the agricultural possibilities of California is that the soil and climate are favorable for the growth of all the products—that is, valuable and high-priced crops—which made the region around the Mediterranean unique and gave it an exclusive trade, until California intervened; also, that here in the same localities and in adjoining tracts, the raisin, the fig, corn and other cereals, and all the vegetation and fruitage common to the strictly temperate zone, thrive to perfection.

That the extensive grainfields of former years have been or are being converted into farms of less acreage devoted to a new cultivation, and that the combined harvester, which cuts, threshes and sacks the grain ready for market, with its thirty-two mules as a propelling power, is gradually being supplanted with the machinery suited to smaller holdings, are evidences of a new and more modern civilization which is in the line of industrial progress. But this does not remove California from the list of large cereal productions.

Agriculture in California, it should be understood, has passed through several phases. Immediately after the subsidence of the characteristic era of placer mining, the cultivation of cereals began on a very large scale. Fruit was considered to be only of advantage for home needs. When it was discovered that green deciduous fruits could be successfully marketed as far eastward as the Atlantic coast, and ultimately in Europe, and that the distribution of canned and dried fruits might be effected on a larger commercial scale, other branches of farming began to attract attention. Intelligent experiments led to the discovery of many fruit varieties that could be successfully grown and marketed.

The limit of products that may be grown in California is co-extensive with the range of products in all semi-tropical and strictly temperate lands. Means have been discovered to pollinate the fig, so that in California the Smyrna fig is successfully produced, and promises to supply the world. That this is no idle dream is shown in the fact that already California raisin-producers, after but few years' experience, practically have the whole United States as a customer. The prunes of California have driven French prunes largely from the American market, and are pressing the foreign market for a leading position. California dried and canned fruits have secured the trade of the United States and have for several years been extensively exported to Europe and to other parts of the world.

No agricultural experiment that has ever been tried in California has been a failure from the viewpoint of production. It is accepted as a fact that "everything will grow in California." Its great variety of elevation and of climate provide all the conditions essential for plant growth. The most forbidding deserts bloom like the rose at the magic touch of water. Plenty waits only industry, intelligently applied, to give large rewards in all parts of the State, with the exception of the

COMBINED HARVESTER IN A CALIFORNIA BARLEY FIELD.

higher altitudes in the mountains. The foothills and the valleys, the interior and the coast counties alike, are prolific in agricultural products. In the northern and central counties of the State crops have been annually produced at commercial profit without artificial irrigation; but it has been demonstrated that artificial irrigation not only enhances the yield greatly, but is an assurance of success. Wherever there are well-established irrigation systems, fruit crops are certain and large. The southern counties of California have from the beginning been compelled to rely upon artificial irrigation, the rainfall south of the Tehachapi Pass being much less than in the counties farther north. The northern and central counties have also of late years created large and successful irrigation systems.

AFTER THE THRESHING.

The beet sugar industry is capable of large increase. Experience and scientific experiments, as well as climatic conditions, attest the superior merits of California for sugar beet-growing.

The opportunities for development of tobacco-growing are recognized. The peculiar quality of soils in California renders fertilizing unnecessary for the tobacco plant, which is a material saving as compared with other states. The absence of frost during the growing season is a feature of importance in the cultivation of tobacco. Parties most familiar with tobacco-growing contend that it will ultimately be largely engaged in and be profitable here.

Livestock-raising is very largely and successfully engaged in. The foothill and mountain districts, at one time erroneously considered among waste lands, furnish rich pasturage—the higher mountain elevations in summer, and the foothills in winter—thus giving favorable

conditions the year around. Animals is this State mature and reach their growth at an early age. A two-year-old animal attains about the size of a three-year-old in other states. A large area of alfalfa during the last few years has added greatly to the livestock interests.

The breeding of horses and mules has been a prominent factor in agricultural development. California thoroughbred horses have stood in the front rank for many years.

In the earlier development of California sheep-raising was a leading industry. In 1876 sheep numbered nearly 7,000,000 and the annual production of wool reached over 56,500,000 pounds, bringing over $10,000,000 to the State. Other agricultural pursuits become more profitable, besides the demands of increased population displaced sheep hus-

ON THE WAY TO MARKET.

bandry, and after 1876 sheep-raising declined in importance. It is, however, still a large industry, both for mutton and for wool, and will continue to be, as the ranges unsuitable for cultivation in the foothills and mountains are well suited to this industry. The present product of wool for the State aggregates about 22,000,000 pounds.

Hogs are extensively raised, but not in sufficient numbers to supply home needs. With the increased acreage in alfalfa and the extension of the dairy interests this branch of farming is on the increase. Indian corn, the great product of the Middle West for fattening hogs, is lacking in the State, and its substitute is barley, which is found to be equally well suited to that purpose. This branch of farming is capable of large increase. On account of the quick returns and the sure profit it affords, hog-raising is attracting much attention.

Despite the fact that every possible condition favorable to the poultry

business exists, large quantities of eggs and poultry are imported annually. It may surprise the farmers in the East and West when the fact is known that some farmers in California send to the town store for butter, eggs and chickens. Eggs and chickens are generally the by-products of the Western farm, but they go a long way toward the support of the family. The California farmer has yet to learn the value of the farm by-product.

The production of honey is worthy of consideration. In the central and southern portions of the State, and to some extent in Northern California, the business is made a separate occupation; the output is large and finds market in the East and West. As a by-product of the orchard

GRAIN BARGES ON THE SACRAMENTO RIVER.

and farm, bee culture has value. In orchards it has been found that bees aid in the pollenization of the fruit-tree blossom.

It will, therefore, be seen that agriculture in California covers a wide scope and affords opportunity for important development. The last quarter of a century has given demonstration sufficient to justify expectation far beyond any present development. The application of scientific methods is bringing into this department of industry intelligence and capital from various parts of the world that promises great results. This, coupled with peculiar climatic conditions, gives to farm life and the country home features of attraction hitherto unknown.

Most of California's oranges are grown in the southern and lower central parts of the State; practically all the fresh deciduous fruit was shipped from Northern and Central California. The raisin center is in Fresno County and vicinity; the prune center is in Santa Clara County and vicinity; of the dried fruit over eighty-five per cent goes from the

northern and central portions of the State, and these sections give an exceedingly large percentage of the canned fruits; the walnuts are principally grown in the south, while the almonds are mostly from the north; the fresh peaches, pears, cherries, plums, apricots, etc., nearly all go from north of the Tehachapi Mountains, which divide Southern California from Central and Northern California. The annual production of wine is now about 30,000,000 gallons.

HORTICULTURE IN CALIFORNIA.

By E. J. WICKSON,

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Certain facts which are of great interest and importance in connection with fruit-growing in California are these:

First—Fruit-growing and the manufacture of fruit products constitute the leading industry of California. The output, from its beginning on a large commercial scale about 1880, has shown an average increase in value of about $2,000,000 per year, and has now reached a total annual value of more than $60,000,000. This constitutes California the greatest fruit-growing State of the Union.

Second—The reasons for this eminence of California in fruit-growing are several:

(*a*) The possession of climate which insures the life and thrift of the tree or vine. This can be appreciated when it is understood that, except at elevations greater than those chosen for fruit planting, there is no cold severe enough to freeze the ground and no winter-killing of trees.

(*b*) The length of the growing season, the absence of summer rains, the brilliance of the sunshine, and the adequacy of sun heat promote size, beauty and quality of fruit and favor the manufacture of evaporated fruits at a minimum cost.

(*c*) The combination of conditions, which befit the growth of both semi-tropic and temperate zone fruits, gives California command of a variety of fruits which no other State possesses in such fullness and perfection. This will appear more clearly as the different fruits are separately discussed in this paper.

(*d*) The occurrence in California of vast areas of deep, loamy soils, rich in plant food, easy to cultivate and encouraging root growth to a depth of ten feet quite generally and occasionally twice and even thrice that depth, as shown by actual digging. Though this is true, it is also true that shallowed soils are successfully employed in growing fruit.

Third—Aside from natural conditions of climate and soil, fruit-growing has reached its present eminence in California through the

high intelligence, energy and business ability which are found in the agricultural population of the State. These qualities of citizenship have made it possible to develop methods of growing, preserving and distant marketing of fruits which are new and characteristic of California. The employment of these methods, coupled with the acceptable nature of horticultural work and the opportunity to pursue it nearly the whole year, renders it possible for a horticultural worker to accomplish

CROP OF SWEET WINE GRAPES.

with ease and comfort twice the work which can be compassed in climates which add the embargo of winter to the depression of hot, moist summer weather.

Fourth—But after all, and probably, the underlying secret of success in California fruit-growing is the conception of the tree or vine as a producing machine which must be developed and maintained in the highest degree of efficiency. This idea of a tree widely prevails, and in commercial plantings is sharply and diligently pursued. The tree must have the best shape to bear a fair amount of large, well-developed fruit.

ORANGE ORCHARD, CLOVERDALE.

It must be a low tree in order that all work upon it can be most cheaply done. It must grow every year a sufficient amount of strong, new wood, and to do this it must be pruned to promote this; also to prevent overgrowth and overbearing. On the other hand, satisfactory growth and fruit-bearing must also be promoted by constant cultivation of the soil and by irrigation and fertilization, when necessary. It must be protected in its strength by the absolute destruction of injurious insects, blights and diseases. All this signifies that the tree must be maintained in full possession of its producing powers, and the California grower expects to stand beside his trees, constantly training and pushing them to their work and generously assisting them to all that they need to do it well. It is this conception of the grower's relation to his trees and the discharge of the duties which such relation requires, which have brought to California fruit-growing such notable success and wide repute.

Fifth—California fruit-growing has reached its present eminence because of the wide application of business principles in production and in trade. Many of the leading fruit-growers were formerly prominent and successful in manufacturing and commercial affairs at the East and abroad. They brought to California the wisdom born of experience. They invented new processes and appliances, and they applied the most advanced commercial methods. They matched the favoring natural conditions of soil and climate with their own skill and energy in using them to the best advantage. They have demonstrated the advantage of coöperative organizations for handling fruits in the packing-house and in the markets so clearly that California methods are commanding attention in all parts of the world.

VARIOUS FRUITS COMMERCIALLY GROWN IN CALIFORNIA.

It may be most interesting and convenient to those seeking information about California fruit-growing to state a few of the leading facts about each of the fruits, under its own name, and for ease of reference, an alphabetical arrangement will be followed in each of the groups into which the fruits naturally divide themselves.

DECIDUOUS ORCHARD FRUITS.

Apple. According to reports by the counties to the State Board of Agriculture in 1906 California has 2,612,938 apple trees in orchard, of which about one third were not yet in bearing. The success attained in growing a winter apple very satisfactory to the trade and capable of distant shipment constitutes this fruit one of the most promising and popular at the present time. About one thousand carloads are shipped beyond state lines, and a considerable quantity reaches the London market, selling at the highest prices. There are two distinct branches to the apple industry of California: one is the growing of early varieties, like the Artrachan and Gravenstein, for sale in the northern parts of the Pacific coast and in the interior mountain states before the earliest apples can be ripened in those parts. The localities where these early varieties are chiefly grown for such shipment are in the Sacramento Valley and the foothills surrounding it. The forcing heat

CHAMBER OF COMMERCE, LOS ANGELES.

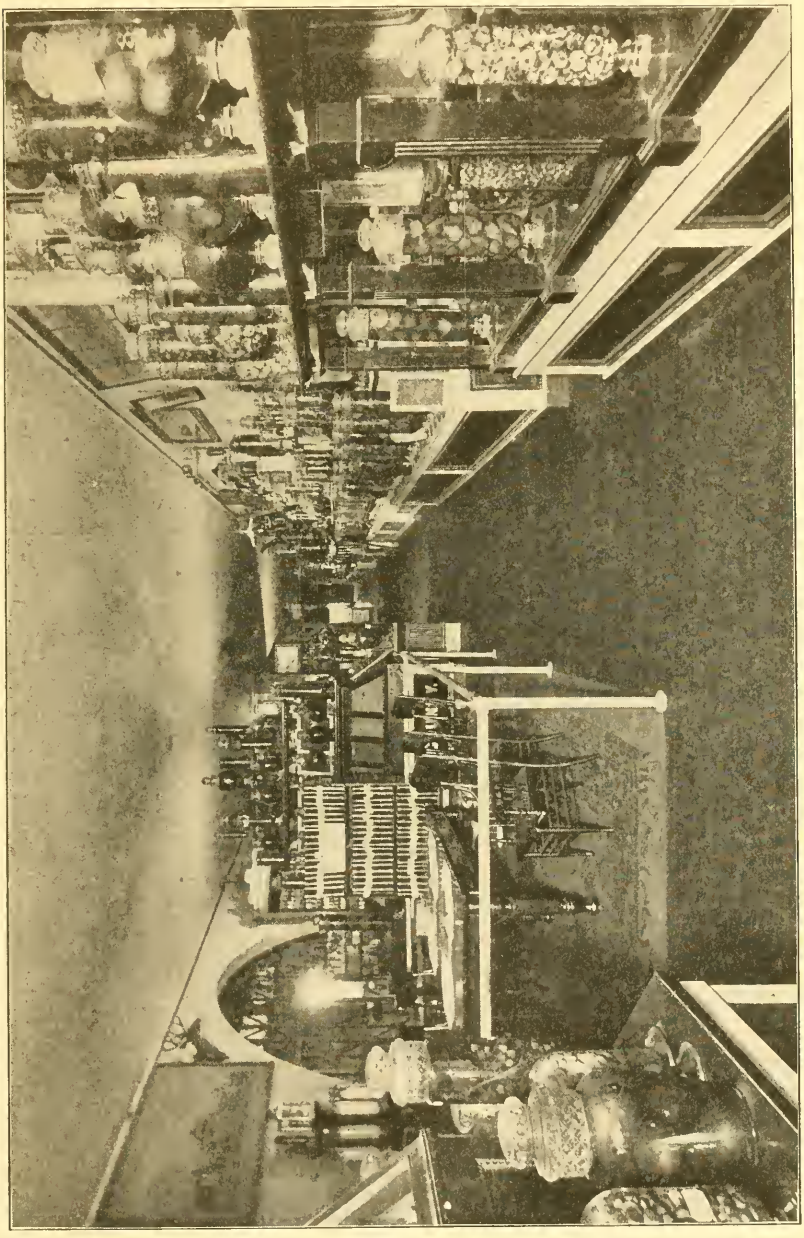
of the spring and early summer brings these varieties quickly to notable size, crispness and flavor. This heat, however, continued into the summer and autumn, makes the same districts quite ill-suited for the growth of winter apples, which are prematurely ripened and lack quality and keeping power.

The second branch of the California apple industry, then, the production of winter apples, is undertaken in parts of the State quite different in climate from that of the early apple regions. The requirements of a winter apple are fully met by two main divisions of the State, viz.: the smaller valleys close to the coast, in fact, in some cases, the coast flats, where the exposure is directly toward the cooling breezes of the ocean which produce a cool summer—a long, slow-growing season, which develops the greatest beauty and highest quality in a winter apple. Similar results are also produced by the climate found at an elevation of from 2,500 to 5,000 feet on the interior plateaus and in the mountain valleys. The coast district has developed a greater commercial apple industry than the mountains, because transportation facilities for shipment are vastly better; but as the State advances the mountain districts will be employed in this production much more largely than at present. The greatest apple district of the State is the Pajaro Valley, including parts of Monterey and Santa Cruz counties, centering at Watsonville, which shipped about 3,500 carloads of apples in 1907. The counties next prominent in apple-growing are Sonoma, Mendocino and San Luis Obispo, while many other counties have good apple orchards in less total acreage; in fact, from San Diego on the south to Siskiyou on the north, localities exist which afford the elevation or the coast exposures which favor the production of good winter apples, and planting is progressing in all these districts.

Apricot. California has 2,612,938 apricot trees, which stand in the open air without protection of any kind and bear large, luscious fruit. That apricot trees can do this constitutes one of the unique features of California fruit-growing and proclaims it different from fruit-growing in other states, for, excepting a few localities in other parts of the Pacific Slope, California has a monopoly of apricot-growing. And yet the apricot does not find all parts of California suited to it. The whole northwest quarter of the State, north of San Francisco Bay and west of the high ridges of the Coast Range, does not grow apricots commercially, nor does this fruit anywhere ascend above an elevation of 1,500 feet upon the foothills. It is particularly a fruit of the protected coast valleys south and east of the bay of San Francisco to the southern end of the State; also of the great interior valleys and lower foothills, avoiding, however, the low places in these valleys where spring frosts may injure the crop though the tree is not harmed. For these reasons it is wise to choose locations for the apricot with some discrimination, but such large areas of land are practically safe that the present great product can be several times multiplied if the world's market should favor it. The California apricot is of superior size and quality, and in canned and dried forms is finding a free field in the countries of northern Europe for any surplus which is not required in the United States.

A point of advantage with the apricot, as with the pear and peach and to a less extent with the nectarine and plum, is that it has three

great lines of demand: first, as fresh fruit, of which 279 carloads were shipped to Eastern markets in 1905; second, as canned fruit, with a



PERMANENT EXHIBIT OF THE STATE BOARD OF TRADE, SAN FRANCISCO.

product of 397,350 cases, each containing two dozen 2¼-pound cans; third, 38,500,000 pounds of dried apricots. Counties growing apricots

largely are as follows: Santa Clara, Solano, Ventura, Los Angeles, and Alameda, while several other counties closely approach them. Some of these counties are five hundred miles apart and their success with the apricot shows how widely suitable locations are distributed over the State.

Cherry. The cherry is one of the lesser orchard fruits of California, because the regions which favor it are fewer and because its commercial field is less; but in the size and quality of the fruit and the prolific bearing of the tree the cherry is a great fruit in locations which meet its requirements. The cherry requires a modification of summer heat and of the dryness of the summer air, and for these reasons it does not thrive on the interior plains, even when irrigation is employed to regulate soil moisture. In the coast valleys, however, in the upper part of the State, in the smaller valleys tributary to the great Sacramento Valley and on the river lands, where depth of soil prevails and modification of air-dryness is secured by abundance of adjacent water, the cherry behaves magnificently. Elevation also secures conditions suitable to the cherry in some cases, notably in Southern California, where the products of trees in mountain valleys at an elevation of 2,000 feet or more is satisfactory and profitable, though the trees on mesas below, where citrus fruits thrive, are disappointing. There are 671,666 cherry trees in California, of which Santa Clara, Alameda, Yuba and Solano have the largest plantings. Cherry-drying has never largely prevailed in California. The shipment of fresh fruit to the East has overcome its chief difficulties and is now rapidly increasing—the shipment of 1905 aggregating over 279 carloads. Cherries are constantly growing in volume as canned fruit, the product of 1903 being about 142,525 cases. The acreage at the present time is extending on the basis of the improving shipping and canning demand.

Peach. The peach is the greatest orchard fruit of California of the deciduous class. A few years ago it was surpassed in acreage by the prune, but the prune was over-planted in situations not befitting it, and such unwise extensions have largely disappeared. This restores the peach to the supremacy which it held previous to that unfortunate incident, as it has had no reverses, but has rather gained continually in popularity. The peach has a very wide range in California. It goes beyond the apricot in the coast valleys north of San Francisco; it goes beside the apricot wherever the latter thrives in the interior; rises a thousand feet above it on the foothills, and goes lower on the plains into the frosted areas with less danger. The peach is a grand fruit almost everywhere; it has a ripening season with different varieties and different locations from May to December, though, of course, the midseason varieties constitute the great commercial crop. The varieties most largely grown are of California origin, being chiefly selected chance seedlings taken up by enterprising nurserymen on the approval of the growers with whom they originated. These varieties have gained fame by embodying qualities acceptable to three main lines of disposition indicated by these notes of the product, viz.: Shipment of fresh peaches overland in 1905, 1,946 carloads (the greatest volume of any deciduous fruit); canned peaches, 1,494,750 cases (the largest canned product of any single fruit); dried peaches (1905) 35,000,000 pounds (larger than any other tree fruit except the prune). This product, as

indicated above, is derived from nearly all parts of the State, though mainly from the great interior valleys (the San Joaquin and the Sacramento) and the foothills. Four counties, Placer, Fresno, Tehama and Santa Clara, have over 500,000 trees each, while Kings, Solano, Sonoma and Tulare have over 200,000 trees each. About ten other counties go above the 100,000 mark. The California peach, though it is now eminent, has even a greater future before it.

Nectarine. The nectarine is a smooth-skinned peach, but is much less than the peach in product and popularity. The canned product of nectarines is 5,000 cases, and the dried product but 400,000 pounds. California produces a magnificent

DRYING FRUIT.

nectarine, but the demand for the fruit does not justify the effort for large product, though the outlook is improving.

Pear. Because of conditions favoring the growth of pears of the most popular market sorts in greater beauty and volume than they can be produced in older States and countries, the California pear has commanded wide attention in distant parts of the United States, and, like the apple, has commanded the highest price for fresh fruit in the London market; in fact, in 1904, the pear stands next to the peach in this trade, 2,186 carloads being shipped out of the State in that year. The pear also is high in canning, the product being 565,000 cases in 1906; in drying the same is true, as the normal annual output is about 6,000,000 pounds. The pear resembles the peach in its wide range over coast valley, interior valley and foothill situations, but it extends beyond the peach, for it goes to an altitude of 5,000 feet on the mountains and it descends to the lowest

places in the valleys, for neither frost nor standing water can avail against it. It escapes frost by its slow start in the spring, and it endures water and even a degree of alkali in the soil by the hardy character of its root. In ripening, also, it is not injured by a degree and duration of heat which ruin the quality of a winter apple. Until recently the pear was free from the "fire blight" in California, and there seemed no limit to the possibilities in pear-growing. During the last few years it has done great injury, but is being vigorously fought. The pear census shows the existence of about 1,800,000 pear trees. The leading pear counties are Solano, Santa Clara, Placer, Sonoma, Sacramento, El Dorado, Contra Costa, Yolo, Yuba, etc., but almost every county in the State grows the fruit in commercial quantities. The varieties grown are comparatively few and the Bartlett is chief, because there are fully two months between the first to mature in early districts and the last in late districts, and during all this time supplies are ample for shipping, canning and drying of this one exceedingly acceptable variety which permits no intruders while it is in season. The growing of later pears is limited, because the Eastern-grown winter pears are usually available in large quantities in the Eastern markets after the California Bartlett has had its run. Still, a few shippers are making excellent records with winter pears in distant markets.

Plum and Prune. By demonstrating the suitability of the climate for the free-fruiting of the choicest varieties of the European plum, California growers freed themselves from the burden of building up on the basis of the wild American species which Eastern growers have done with so much credit to themselves. California has no need to seek hardy plums, for the tenderest are perfectly satisfactory; nor does California have to circumvent the curculio and the black knot, for these have never appeared in the State. The French prunes were introduced at an early day and the product was so successful and profitable and won its way by displacing European prunes in American markets, that there arose ere long almost a rage for prune-planting, the product of which, rising to nearly 200,000,000 pounds of dried prunes in 1906, has outgrown the requirements of the United States and is being pushed for sale in Europe, even in France itself. Probably even greater success than could have been anticipated in disposing of this immense volume of prunes has been attained, and yet as free and profitable an outlet as is necessary has not been secured. The prune has been depressed, acreage has been somewhat reduced (as stated in the foregoing discussion of the peach), and at present there is less interest in prune-planting, except where an exceptionally large fruit, can be counted upon. Strenuous efforts are being made to popularize the prune as a desirable food, to push the product into markets in all parts of the world, and to realize fair returns for such an excellent fruit as the California prune is conceded to be. Good results may be expected from such efforts, but it is probably wise to be conservative about extending the acreage until some assurance is had. California has invented new processes of curing prunes by machinery and other labor-saving appliances, and has endeavored by human devices to match the economy of production to which nature contributes free sunshine and dry air. Probably nowhere in the world can so rich and delicious a fruit food as the California

prune be so cheaply produced, and it is reasonable to expect that the world will need all that can be produced when organization for distribution and trade is made effective. The largest prune-producing counties are Santa Clara (which has nearly one half of all the prune trees in the State), Sonoma, Alameda, Solano, Tulare, Santa Cruz, Kings, etc.—both the coast valleys and the great interior valleys participating in the production.

Of plums, aside from varieties which are dried without removal of the pit (and therefore called prunes), the production is relatively small and largely restricted to the Japanese and a few other varieties which are particularly adapted to fresh-fruit shipments and canning. These fruits are largely grown in the districts where early ripening can be

CURING PRUNES.

counted upon. The size and beauty of the shipping and canning plums of California are striking, and the product reaches a good volume, viz.: plum shipments, fresh, in 1905, 1,391 carloads; canned plums, 193,550 cases; dried plums (other than prunes), 200,000 pounds.

NUTS.

Almond. California produces practically the whole of the almond crop of the United States, and thus stands as the only source of a home-grown almond supply for American markets. The California interest is large, comprising 1,440,980 trees, and the product in favorable years reaches about three hundred carloads. There is, however, considerable irregularity in the annual crop, because some districts are liable to frost injury. The almond is a very restless tree during the California winter, for the temperature in the

valleys is always near the point which induces blooming and rather a light frost may injure blossoms and young nuts. For this reason it is very important to select locations for almonds where there is a minimum danger of frost. These are found on the bench lands around small valleys, while the bottom lands in the same valleys might be quite frosty and should be planted with later blooming fruits. Frosts are also less frequent on the plains of the interior valleys where there is a free circulation of air which tends to equalize temperatures, while on the river bottom lands the trees may be unproductive though growing thriftily. The almond does not thrive at elevations in the foothills and seems to be a bench and valley fruit, but even within these limits locations must be chosen with close attention to local topography. The chief product is

HARVESTING ALMONDS.

grown in Yolo, Contra Costa, Solano, San Joaquin, and Tehama counties, which are in the central and northern region of the State, although many other counties contribute in a smaller way.

Chestnut. The California chestnut product is small and consists almost entirely of the Italian variety grown in the interior valleys and foothills. The production of the best chestnuts of American and European varieties can be largely and probably profitably increased, but no particular attention has been paid to the matter, except by a few enterprising growers.

Peanut. On light loams all through the lower lands of California, the peanut thrives well and makes a large product of exceptionally large, bright and well-filled nuts. In Southern California the chief product is on the lower lands of the coast region, while in Central and Northern California peanuts are mostly

grown on the alluvial loams of the river bottoms of the Sacramento and San Joaquin valleys, although the crop is sometimes raised between fruit trees on the light upland loams. The product is quite profitable to those who master the details. Though it might be a question as to whether California should enter into competition in the general markets of the country, there seems no good reason why the crop should not be brought up to the demand for local consumption. At present only about one fifth of the peanuts used in California are grown here.

Pecan. The pecan grows well and bears well in the lower lands of the interior valleys. It does not behave well near the coast where the seasons are not well defined, nor does it thrive in the drier regions of the interior. On deep lands, however, where moisture is ample and where the approach of autumn is marked by rather sharp frosts, the pecan stops its growth and matures its nuts satisfactorily. The product has not yet risen to commercial importance.

Walnut. The English walnut is the greatest nut grown in California, judged by the volume and value of the product, by the breadth of its adaptability to California conditions, and by the greatness of its outlook. The present commercial product is about one thousand carloads in a good season, and there are upwards of 1,000,000 trees in orchard—about one third of the number not yet in bearing. The present product is almost entirely grown in three counties in Southern California: Orange, Los Angeles, and Ventura, and the adjoining counties of Santa Barbara and San Luis Obispo stand next in acreage of walnuts. During the last few years, however, owing to the profitableness of the walnut, there has been a large planting in the central part of the State, and the product of the future will be drawn from a wider territory than hitherto. The walnut tree is, in fact, content with the coast, interior valley and foothill climates, providing it has sufficient depth of soil to sustain it and to furnish the constant, but not excessive water supply which it needs. Where the rainfall is large and the soil deep enough to retain moisture and yet open enough to prevent standing water, walnuts yield satisfactory results without irrigation. In places with light rainfall or where the soil is too shallow or non-retentive to hold moisture for the long growing season, irrigation is requisite. There is, however, need to select varieties with some regard to localities. In Southern California a local seedling, known as the Santa Barbara soft-shell, is chiefly grown. This variety is not so well adapted to conditions in the upper part of the State. The French imported varieties, especially the Franquette and Mayette, and some California seedlings locally originated are better and are now being largely planted. These varieties are hardy against spring frosts because of their late blooming, and they resist the sun heat of the interior. The Southern California variety is injured by these agencies, but as they are reduced to a minimum in the Southern California coast regions, the resistance of a variety is not of as much concern. Recently a bacterial blight has been spreading and occasioning considerable losses in some years, but is not considered serious enough to resist planting.

THE GRAPE AND ITS PRODUCT.

The grape grows in all parts of California, from near sea level on the coast to an elevation of five thousand feet or more on the mountains. It is contented, too, with nearly all fertile soils, from the deep valley loams, where the great, fat, firm-fleshed grapes are grown for raisin and table purposes, to the shallower soils of the high foothill and mountain slopes, where the grapes are less in quantity, but of superior aromatic quality. This wide adaptation gives an immense area suitable for grape culture, but the chief reason for the achievement and the promise of the grape in California is in the fact that the European species, *Vitis vinifera,* thrives, and thus the California grower has command of all that Europeans have accomplished in centuries by developing special varieties of the species for special purposes. The grapes of the states east of the Rocky Mountains are not grown in California because the European varieties are the only ones from which raisins can be made; they also furnish the world's wine and brandy and they give size, beauty and shipping quality beyond all comparison with American varieties. Wherever wealthy Eastern connoisseurs choose grapes for their glass houses they select European varieties; the Californian grows his "hothouse grapes" in the open air. He also grows them without the cost of trellising, because most of the European varieties will bear well in short-pruned bush form.

California has a large acreage of grapevines, and planting has been very active during the last few years because good prices have usually prevailed. The number of acres of table grapes is about 30,000; of raisin grapes, 90,000; of wine grapes, 150,000. Table grapes are grown for local use everywhere and for shipping, chiefly in Sacramento, San Joaquin, Placer, Fresno, Santa Clara, and Santa Cruz counties, although other counties participate in this branch, which sent out of the State nearly 3,500 carloads in 1907.

The raisin interest is chiefly concentrated in the center of the San Joaquin Valley in Fresno and Kings counties, though there is a raisin product of some moment in the Sacramento Valley and in Southern California. The total product of raisins is upwards of 125,000,000 pounds.

The wine and brandy interests are widely distributed through the length and breadth of the State. The annual product during recent years is placed at 32,000,000 gallons of wine and 5,700,343 gallons of brandy—the latter being exactly known, as it is under the supervision of the United States revenue officials.

SEMI-TROPICAL FRUITS.

Space will admit only of reference to those fruits of the semi-tropical class which have reached considerable commercial importance; others which are at present succeeding with amateurs, and some of which may ere long reach economic account, are too numerous for discussion. Suffice it to say that the date fruits freely in central parts of the State and is now being advanced by systematic effort through plantings on the Colorado desert by the United States Department of Agriculture. The banana is fruited for home use in many thermal

situations. The pineapple is grown in frostless places near the coast in Southern California. The cherimoyer is found in the markets of Los Angeles, while the alligator pear grown in Southern California reaches the markets of San Francisco as well. The latter fruit is quite hardy in several parts of the State. The guava and the loquat are increasing in product and popularity, and new varieties of the latter originated in Southern California are likely to be widely known. The persimmon and pomegranate grow in nearly all fruit districts, but only a limited amount can be profitably disposed of either locally or by distant shipment. Many other fruits deserve like mention, but must be passed over.

Fig.

The fig is one of the great fruits of California. Old trees attain the dimensions and aspect of oaks and bear so much fruit that it becomes of some importance in swine-feeding. The tree is perfectly hardy in all coast and interior situations (except in a few places where the temperature falls ten or twelve degrees below freezing) and no thought is given to protection. This fact, demonstated more than a century ago by the padres at the old missions, naturally suggested the fig as a great commercial fruit and for decades it has been successfully grown, and trees have been reported to the number of 470,381 in nearly all counties except those of the mountains. Production has, however, been restricted by the fact that fresh figs do not take kindly to long shipment, and by the fact that our dried figs did not compare well with the product of Smyrna. This condition has, however, been completely changed by the experience of the last five years. The fig industry comes upon a new basis through the successful introduction of the pollination insect which is essential to the success of the Smyrna fig. California Smyrna figs are now being produced in considerable quantities and California is thus equipped to enter into competition with the time-honored Asiatic product for the world's trade in dried figs. Trees of the true Smyrna varieties, and of the wild fig which favors the multiplication of the insect, have been growing for years in different parts of the State, but the insect was absent and the trees unproductive. With these old plantings and the new orchards now being planted, there will be a large product of higher-class dried figs than has been produced hitherto. Much interest is now being manifested in this enterprise.

Olive.

The olive is another fruit which has been successfully grown in California for more than a century. The importance of the olive as a food in the south of Europe and its standing as an export thence to populous northern countries, coupled doubtless with its favored place in song and story, induced a premature popularity among California fruit-planters, and experience with the fruit has not justified all the expectations cherished for it. Planting practically ceased and considerable acreage displaced, but at present the olive has a much brighter outlook. There are many difficulties with the olive which may be briefly mentioned: The popularity and acceptability of cheap substitute oils for salad purposes militate directly against profitable production of olive oil, because appreciation of the superiority of the latter is less liberal than expected; pickled ripe olives are difficult to produce with good keeping qualities; the

fruit itself is largely subject to interior decay in advance of maturity; the trees of many varieties which have been largely planted are shy in bearing; trees planted in dry places do not grow and bear as promised by optimistic promoters; the work of gathering the fruit and securing its products is more difficult and costly than calculated. The fact is, the olive was boomed in California among spectacular and speculative lines, but the industry is outliving the mistakes which have been made. California will produce profitably good olives and olive products in suitable places and through the efforts of masterful men and women who can rise to the requirements of production and protection against imitation articles of the trade.

Lemon. Wonderful progress has been made in developing the lemon industry in California, and imported lemons have been measurably displaced from the markets of the United States by the California product. Good varieties have been secured, and new methods of culture and fruit-handling have been devised. The record of planting shows about 1,500,000 trees now growing in the State and about 5,000 carloads of the fruit have been shipped to distant markets in a single year. Though lemon-growing is practiced in most sections where oranges are produced, the present product is chiefly made in the three counties of Santa Barbara, Ventura, and San Diego; all of them coast counties of Southern California. The lemon does best in a practically frostless place, being more tender than the orange. For this reason the chief product is in the southern coast counties. In suitable situations in the interior, however, the lemon does well, but has been largely displaced by the orange, which has been on the whole more profitable and is marketable fresh from the trees, while the lemon requires curing and a good part of the crop has to be held from winter maturity to be sold in the following midsummer, when the chief demand for lemons occurs.

Orange. California has accomplished more with the orange than with any other single fruit, and the advance during the last few years has been exceedingly rapid. At present, not only is the United States largely supplied with California oranges, but the fruit is being successfully sold in England and Germany. There are upwards of 10,500,000 trees in the State and the shipment beyond State lines has reached 29,497 carloads. Nearly nine tenths of this vast amount of fruit comes from Southern California, but recent plantings have been largely in the foothills east of the San Joaquin and Sacramento Valleys in the central part of the State. The orange thrives in suitable situations through a north and south distance of over six hundred miles, and the topography of the State is such that similar winter and summer temperatures occur all through this distance. There is fortunately, however, some difference in the ripening of the fruit in the different portions of this belt, and the northern portion, because of its mountain environment and distance from the ocean, has an earlier spring and summer and is therefore able to ripen its oranges for an earlier autumn market. This difference distributes the fruit through a greater number of months and is of great advantage to the product. In fact, by choice of early and late

varieties, and by using the variation in the season of maturity, California can furnish fresh oranges in large quantities all through the calendar year and renders the country practically independent of importations. Another advantage peculiar to California is that the orange grown in a dry summer is more dense in texture and has much better keeping and shipping quality than an orange grown in a humid summer. The fruit is also more sprightly and refreshing, and though there is some controversy over the alleged superior sweetness of the Gulf fruit, the demand for the California fruit and the prices which it commands are evidences of its wide popularity. Although the California growers have made the most energetic and systematic efforts for the wide distribution of the product, for several years the fruit has proven so acceptable that it is evident that the consuming capacity of the United States is still beyond reach and the outlook for the California orange is very promising.

The pomelo, or grape fruit, is also grown in California, but has not met the extent of demand which was anticipated, although a certain quantity is profitably sold.

SMALL FRUITS.

In California the term "small fruits" signifies only berries and currants, as the cherry is always classed by us with other great orchard fruits and the grape stands alone as the foundation of a great fruit industry, as has been indicated. Aside from supplies for home use and local markets there is a large field for small-fruit growing for shipment. Berries are largely used by canners, as is shown by the output of 1906, viz.: blackberries, 68,675 cases; strawberries, 22,280 cases; raspberries and loganberries, 21,895 cases. Small fruits are also shipped from California to markets from one to two thousand miles distant in the interior states and territories to the north and east. The earlier ripening of these fruits in California gives our shippers an opportunity to place the product in this vast region, although there are home-grown supplies later in the year. The growing of small fruits is scattered over the State, and the special regions are widely distant from each other. The most prominent for strawberries are the San Gabriel Valley in Los Angeles County, the Pajaro Valley in Santa Cruz and Monterey counties, and the Florin section in Sacramento County. There are, however, many places which have a smaller acreage, but special reputation for fruit out of season; in fact, it is possible to find ripe strawberries every month in the year at some point or other in the State.

A GENERAL REMARK.

On the whole, the fruit products of California are being easily disposed of at fairly remunerative rates, and the business is in good heart and enjoys a good outlook. There is, of course, fluctuation in the values of different fruits and in the market conditions which they meet at distant points. Such "off years" strike the fruits somewhat irregularly and are discouraging first to one special grower and then to another, and as our localities are largely given to specializing,

according to favoring culture conditions, there is opportunity for complaint somewhere nearly every year. Still, we find that our fruit-growing districts have the busiest towns, the handsomest rural improvements, the largest assessment rolls, and are most attractive to homeseekers. While these things are true our fruit industries must be counted in prosperous condition, although the greatest anticipations are not always realized.

THE CITRUS FRUIT INDUSTRY OF CALIFORNIA.

By B. A. WOODFORD,
General Manager California Fruit-Growers' Exchange.

The growing of citrus fruits in California dates back approximately one hundred years, although the business only assumed commercial proportions some twenty-five years ago, and its great development has come within the last ten years.

It is proper to divide the citrus fruit industry into three parts; the orange, the lemon, and grape fruit.

THE ORANGE.

Although all known varieties of oranges are grown in California in greater or less degree, more than ninety per cent of the entire output is composed of the Washington Navel and Valencia Late, the principal commercial varieties; the former maturing from November until June, and the latter from June to November. The Washington Navel has been for many years the leader among California citrus fruits and firmly established in the markets of the entire country. Full sixty-five per cent of the entire output of the State is of this variety, and not only has the superiority of this fruit captured practically all the markets of the United States, but also those of Canada. The Navel orange is not unknown in England, and its popularity is gradually extending to various other European countries.

The Valencia Late ten years ago was comparatively unknown in this country, the output at that time being very small. Realizing its value, however, as a summer and fall orange, a considerable acreage was set by the more enterprising California growers, with a result that to-day fully fifteen per cent of all orange shipments are of this variety. The demand for it is becoming general throughout the entire United States, and its relative importance has increased in the last few years more rapidly than that of any other variety of citrus fruit. It is not unreasonable to suppose that in another ten or fifteen years the quantity of Valencia Lates marketed annually will at least equal the present output of Washington Navels.

Other varieties are shipped in commercial quantity, the most important of which are the Seedling, Mediterranean Sweet, different varieties of Blood Oranges, Saint Michaels, Tangerines, Mandarins, and others in lesser quantities.

By far the greater portion of the orange crop is grown in Los Angeles, Riverside, San Bernardino, Orange, and Tulare counties, although many other counties produce a considerable commercial quantity. Many sections of the state that were formerly not considered suitable for growing citrus fruits have during the last few years come into prominence and are now fully proven in a commercial way. Notably among these is the great foothill section of the upper San Joaquin Valley, including such points as Porterville, Lindsay and Exeter in Tulare County, and choice foothill locations in Sacramento and Butte counties. Approximately fifteen per cent of the entire citrus fruit acreage of California is located in these new sections.

The entire output of oranges of all varieties has increased in the last

SETTING OUT THE TREES.

ten years from three and one half million boxes in 1899, to ten and one half million boxes in 1908. The value of the California orange crop f. o. b. cars for shipment during last season was approximately $17,000,000.

THE LEMON.

A relatively small quantity of lemons had been produced in California for many years prior to 1890, but the planting did not become general until about 1886 to 1892, during which period some ten to fifteen thousand acres were set. Methods of picking, packing and shipping were not of the best in the early years of the lemon industry. The California product was unknown in the eastern markets, where the foreign or Sicily lemon was supreme, and when this large new acreage came into bearing the supply exceeded the demand, and until the season

of 1905 the difficulties of the lemon-grower were many and it was a question if the industry would survive. During the last few years, however, under better handling methods and the help of a protective duty of one cent per pound imposed on imports, the situation is in far better shape and there is an excellent prospect of the further development of the California lemon, until instead of supplying forty per cent of the quantity consumed in the United States, as at present, we shall supply practically the entire needs of this country. The output increased from 300,000 boxes in 1899 to 1,600,000 in 1908, the value of

IRRIGATING THE TREES.

the total crop during the latter season being approximately $3,000,000 f. o. b.

GRAPE FRUIT.

The California grape fruit industry has not yet assumed great proportions, due largely to the fact that the wrong variety was generally planted in the early days, and in many instances on the wrong kind of soil. The grape fruit that is most popular, both on the Pacific coast and throughout the East, is that variety known as Marsh's Seedless. The demand for this variety exceeds the supply many times over. Grape fruit is thinner skinned, of finer texture and of better quality if grown upon an open, porous soil, something that our orchardists have only discovered in recent years. There is every prospect of the rapid development of this particular part of the citrus industry in the near future and on a profitable basis.

One of the peculiar features of the citrus industry in California is the superiority of the "seedless" variety over any other, in oranges, lemons and grape fruit alike. It is a fact perhaps not generally remem-

bered that not only is the Washington Navel orange entirely free from seeds, but the Valencia Late is nearly so, and the principal commercial varieties of California lemons have but few seeds.

I have already stated that Seedless Grape Fruit is the best California variety, and it is evidently a fact that the citrus fruits of all kinds that have no seeds are the ones on which the future reputation of the State as a citrus-producing section will be maintained.

The growing of citrus fruits in California is one of the most enjoyable vocations open to mankind, and being an industry which is now

A THRIFTY YOUNG ORCHARD.

recognized as one of the substantial, legitimate businesses of the State, returning a fair investment on the capital employed, many are turning their attention to it. Under the intense system of cultivation practiced it is possible to obtain as great a net remuneration from ten or twenty acres of ground in citrus fruits in full bearing as would usually be produced from one 160 or even 320-acre farm growing ordinary farm products.

With exemption from the cold storms of the north and east and the most equable climate under the sun, being, comparatively speaking, warm in winter and relatively cool in summer, great and prosperous communities have grown up in the citrus producing sections, numerous cities of from five to fifteen thousand inhabitants dependent wholly upon the growing and packing of citrus fruits being the result.

It is estimated that in California more than 100,000 people are to-day directly dependent upon the citrus fruit industry and more than 100,000 additional persons indirectly so. During the last ten years more than $100,000,000 has been paid to the transportation companies for hauling

California oranges and lemons to market and another $100,000,000 to labor in the growing and packing of these fruits. The supplies used in packing, including boxes, paper, nails, etc., amount to another $20,000,000 during the ten years, enough remaining from proceeds of sale to pay a good rate of interest on their investments to the owners of the property themselves.

The shipments of citrus fruits from California last season approximated 32,500 carloads, each car containing about 400 boxes. In the packing of this fruit there was used more than 3,000 carloads of shook

PICKING THE FRUIT.

for boxes; 300 carloads of paper, 30 carloads of nails; and 15 carloads of labels.

There is now invested in the citrus fruit industry $125,000,000 in the orchards themselves, and more than $2,000,000 in packing houses and machinery.

It has recently been demonstrated that the consumption of citrus fruits, particularly oranges, can be materially increased through advertising, and I do not believe it is unreasonable to expect that a thorough and complete advertising campaign throughout the country would double the consumption, without any corresponding decrease in price to the producer.

If the past ten years can be taken as a criterion by which to judge the future of the business, its development during the next twenty to thirty years should be on such a scale that in 1930, the annual value of the California citrus product should reach more than $50,000,000, as against the $20,000,000 received for the crop during the year 1908.

RAISIN GROWING IN CALIFORNIA.

By D. D. ALLISON.

During the latter part of August or the beginning of September raisin grapes are generally ripe enough to be picked. Picking usually commences when the sugar test registers twenty-four per cent by the saccharometer. Having satisfied himself on that important point the vineyardist makes arrangements for the pickers. The pickers take two rows of vines apiece for convenience, and (in a squatting position, with a small knife they dexterously sever each bunch of grapes from the vine, laying it carefully on the tray, placing all the stems in the same direction. After the picking is finished the trays of grapes are left between the rows of vines to be dried by the sun, and herein lies the particular advantage of that section of the San Joaquin Valley composed of the counties of Fresno, Kings, Madera, and Tulare. In order to successfully evaporate the moisture contained in the grape when picked it is necessary for the fruit to be exposed to as dry a heat as possible. In the counties mentioned above, situate in the heart of the San Joaquin Valley, the sky is cloudless the greater part of the year, and the humidity is at a minimum. The United States Weather Bureau record shows as low a percentage of humidity as six per cent. Such a low percentage is almost unheard of in any other portion of the globe, which is the reason why the excessively high temperature does not affect human health or comfort. In this locality, when the temperature registers 110 degrees, which it occasionally does during an excessively hot wave, the effect is not at all similar to that produced by the hot waves so often experienced in the states east of the Rocky Mountains. Sunstrokes or prostrations from heat are entirely unknown, and no matter how hot the hours of sunlight may be, it rarely happens that a refreshing cool breeze fails to blow throughout the night.

The average time required to dry the crop is about three weeks. The grapes are left on the trays for about fifteen days (according to the degree of temperature), and then turned by placing an empty tray on top of a full one, and by a dexterous turn reversing them, leaving the grapes with the undried side exposed to the sun. They are allowed to remain in this position until dried, usually taking six or eight days. The trays are then stacked in piles of from twenty to thirty, where they are left to go through what is termed the sweating process. After a few days the raisins are ready to be transferred to the sweat-boxes, generally holding about one hundred and forty pounds to a box, and then hauled to the nearest packing-house to be stemmed.

Arriving at the packing-house the raisins are weighed, and are thence trucked to the stemming machine, where the stems are separated from the raisins; the latter being carried by an endless belt and run over different sized screens, which grade them in sizes. They then run through spouts into boxes, holding fifty pounds each. If to be shipped as loose raisins, the boxes are immediately nailed up ready for shipment. If to be placed on the market in the form of seeded raisins, they

are transferred to the seeding plant (although only a recent invention, no packing-house is now considered complete without such a plant), where they are placed in a drier, and all moisture thoroughly evaporated. It is necessary to have them perfectly dry and brittle in order to remove the capstem from the end of each raisin, and also remove every particle of dirt or dust. From this machine they are transferred to the steaming-house, where they are made pliable with steam so that the seeds may be removed without any unnecessary tearing or bruising of the berry. They are now transferred to the seeding-machine proper, where they are run between rubber rollers and carried under a row of miniature saws and punctured, and the seeds forced out by another mechanical appliance. Continuing on their journey, they arrive at

PICKING AND CURING RAISINS.

the packing table, where they are packed in cartons weighing one pound each, thirty-six cartons being placed in each commercial case, in which condition they are ready for the market. It is only seven years since the seeding of raisins was first successfully accomplished, 300 tons being placed on the market in that year; whereas, in the year 1902, there was shipped from the seeding plants of Fresno alone a total of 22,000 tons. Such is a brief explanation of the manner in which seeded raisins are prepared for market.

We will now return to the vineyard, where the men are busily engaged in transferring the raisins from the trays to the sweat-boxes. It is generally profitable to pay pickers an extra charge for sorting from the trays all large and fancy bunches, called clusters and layers, into separate boxes. These bunches are put up in fancy brands, viz.: Imperial, Dehesa and Fancy Clusters and three- and two-crown

London Layers, according to quality or grade. For the finest clusters the vineyardist will generally receive two or three times as much as for the ordinary loose raisins. Since the introduction of seeded raisins the demand for the lower grades of layer raisins has diminished.

In addition to the grapes that are picked and converted into raisins there is usually what is termed the second crop, which ripens about a month later than the first crop on the same vines. This crop is seldom

CURING RAISINS.

made into raisins, the bulk of it going to the wineries to be converted into grape brandy and for which usually a fair price is paid, frequently netting sufficient to pay for the curing of the first crop.

The work of harvesting the crop, etc., is usually completed by the first to the tenth of November, and you can then occupy your time as you desire until the following early spring, as there is little of importance to do until the time for pruning arrives, which is usually the latter part of January or the beginning of February.

The difference in the appearance of a California raisin vineyard

before and after pruning is remarkable; for, whereas, prior to the foliage dropping, the canes usually reach six and eight feet from the body of the vine, making the vineyard almost a solid mass of green, after pruning the vineyard has the appearance of a field of dried-up stumps. On each vine has been left a few spurs, about two inches long, all the balance of the wood or canes having been cut away. It is hard for a stranger to realize that a field of apparently dry stumps can produce the crop of grapes in so short a space of time as they do in California.

After the pruning of the vines and burning of the brush are finished, plowing and cross-plowing are commenced, and then a thorough cultivation, leaving the vineyards in as finely pulverized and mellow condition as possible. Hoeing around the base of the vine, where the plow and cultivator can not reach, is then done, and next the suckers that have started are pulled off. If the vineyard is well taken care of and in a healthy condition there is little more to do until it is time to pick, except an occasional cultivation for the purpose of keeping the soil mellow and of checking any new growth of weeds that may start where the ground is unusually moist.

For the benefit of those who are not familiar with the principal raisin sections of California it may prove interesting, and even a surprise, that the average rainfall is less than ten inches per year. The rainfall during the ten months ending March 1, 1904, was only four inches; and yet, vineyardists did not worry, for, so long as nature stores its water supply on the summit of the mountains in the form of snow, they realize that there is no occasion for alarm.

Prior to the year 1875 the vicinity in which this article is written was a desert the greater part of the year; the pasturing of sheep and cattle for three or four months of the winter and spring being the only use to which it was put. It was not until irrigation was adopted that the wonderful fertility of the soil became known. Then was commenced that stupendous system of irrigation which has been the marvel and admiration of the world, and which has transformed a waste into an amazingly fruitful region.

Previous to the inauguration of irrigation one would have to sink a well from forty to sixty feet before striking water, whereas, at the present time, water can be found a few feet from the surface, the soil having become saturated with the seepage from the many irrigation ditches.

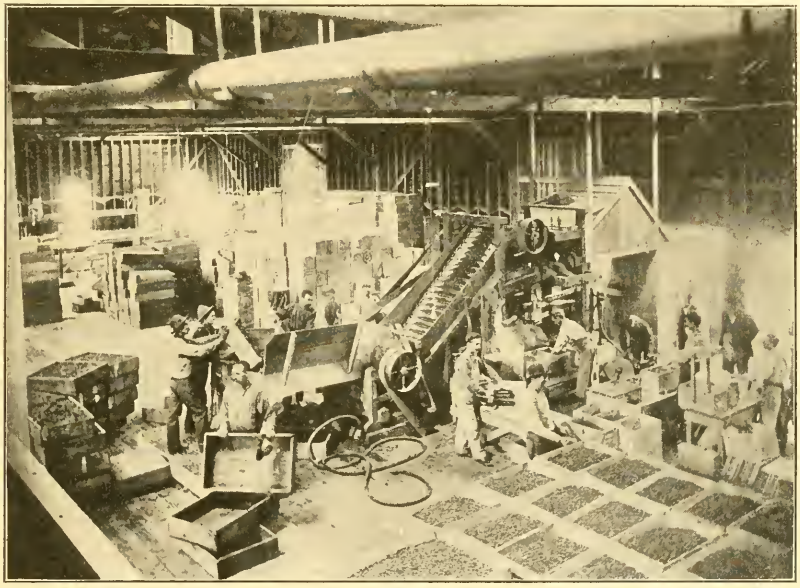
It is not the intention nor the desire of the writer to convey the impression that, having secured a tract of land for a vineyard, or having purchased one already planted, responsibility and care cease. On the contrary, it requires energy, attention, intelligence and patience to make an investment in a raisin vineyard profitable. Nature does a great deal for the tiller of the soil in California, but to reap satisfactory returns from an investment in her lands close attention must be devoted to every detail.

To the intending settler the writer will offer the following advice—and it is for those of limited means that this article is more particularly intended:

Do not be in too great hurry to invest; take time to investigate the

adaptability of the soil to your requirements. Be patient, and endeavor to gather information from those having practical knowledge in the particular branch which you intend to follow. If your means are limited, and you do not feel above gaining knowledge from practical experience, make up your mind to work on a vineyard for a time. You will thus not only gain a knowledge of the method of caring for a vineyard, but you will discover that the men with whom you come in contact in the ranks of hired help are sometimes better informed as to the matters which you desire to know than are some of the men who own thousands of acres.

As already stated, the estimated number of acres planted to the raisin grape in the State of California is 70,000. They are owned by



STEMMING AND PACKING RAISINS.

about three thousand individuals. In this estimate there is to be considered a large number of landowners who follow diversified farming.

The price of land in its natural condition varies according to location and quality. Land located near a town is naturally considered of more value than that at a distance, although the net returns may be less; and to an intending purchaser for agricultural purposes of any description, considering the usual difference in price, unless amply provided with means and not entirely dependent upon the returns of your investment, it would be advisable to purchase a similar quality of land at a less price per acre farther removed from town. Unimproved land suitable for vineyard purposes can be secured for from $40 to $100 per acre. After properly preparing the land and planting the vines it usually takes from three to four years for profitable returns; but by planting the vineyard by degrees and practicing diversified farming,

a person can realize reasonable returns right along until the vines come into bearing.

The best guide for a stranger as to whether a particular locality is prosperous is to note the condition of its public buildings, schoolhouses, churches, banks, public library; its streets, street-car service, railroad facilities, and its residences; and in driving through the surrounding country note if the school facilities are ample, and if the houses are neat and attractive; also, if the general surroundings have an air of thrift. If, upon taking note of these points you form a favorable opinion, you may conclude that it is a safe section in which to invest and to make your future home.

In the San Joaquin Valley are to be found vineyards of from five to one thousand acres, in the highest state of cultivation, without a weed in sight and every row of vines in perfect alignment and every plant of uniform size, giving one the impression that it is an immense garden instead of fruit fields maintained for profit. Whether of large or small acreage you will invariably find the vineyards and orchards equally well taken care of in every particular.

Some who read this article may have had their attention called to some particular instance of phenomenal yield that has been published through the newspapers. Such articles are oftentimes misleading. The writer of this article can quote like instances that would hardly be credited, yet which, notwithstanding they would be absolutely true, would be entirely misleading.

This article has not been written for the purpose of booming any location or section of California, nor to advertise any tract of land. On the contrary, it has been written for the sole purpose of giving reliable and trustworthy information to intending settlers, those who from choice may desire to engage in the raisin industry—the same advice that the writer would desire should he be looking up the advantages of a place with which he is not familiar. It needs no exaggeration of facts to sing the praises of the productiveness of California's soil.

THE FIG IN CALIFORNIA.

By GEORGE C. ROEDING,
Chief of the Department of Horticulture.

No fruit has appealed more to the horticulturist than the fig. It is easy of culture, adapting itself to a variety of soils, and the expense of harvesting is very light as compared with many other fruits. Naturally the great desire of growers of figs is to produce a fruit equal in flavor to the far-famed Smyrna variety from Asia Minor.

In the year 1880 the San Francisco Bulletin Company, backed by the late Senator Leland Stanford, made the first importation of fig cuttings from Asia Minor, and a few years later another shipment was made. These trees were distributed to subscribers of the Bulletin throughout

the State. When the trees were old enough to bear, the fruit, after attaining the size of a marble, shriveled and dropped. Those who planted the trees concluded that they had been duped. Many of the trees were dug up and destroyed in consequence, although isolated specimens are still to be found, the largest number being on the Vina ranch, belonging to the Stanford estate. These trees were planted in out-of-the-way places and have received little or no care. The wily Smyrnaites evidently did all they could to prevent cuttings of the genuine commercial variety being exported, for the trees growing at Vina are badly mixed, consisting of a number of varieties. There are a few of the genuine commercial figs growing there, but they are the exception rather than the rule.

The next variety to attract attention was the White Adriatic, a Dalmatian sort, and it was extensively planted from 1884 to 1890. When the trees came into bearing and the fruit was found to be inferior to the imported figs, no matter how processed, growers concluded that Smyrna figs could not be grown here, conditions apparently not being favorable for their successful culture. Nevertheless, quite an extensive business was built up in Adriatic figs. The shipments are in the neighborhood of 2,500 tons annually. The jobbing trade in the Eastern States regarded California figs as a joke, and it was the consensus of opinion that California would never succeed in placing on the market a fig equal in flavor to the imported.

In the year 1885 F. Roeding, of the Fancher Creek Nurseries of Fresno, having come to the conclusion that none of the figs grown in California were of the same variety as the fig of commerce, decided to send his foreman to Smyrna to make a personal investigation and to secure cuttings of the very best varieties. After remaining a year in the nursery, the first orchard, consisting of twenty acres, was planted in 1887 from these cuttings. In addition to this, there were planted about forty caprifig trees.

The tree producing the caprifigs is necessary for the production of the Smyrna fig. Without caprifigs Smyrna figs can not be produced. It is in this one respect that the Smyrna type of figs differs from all others; for unless the female flowers of this fig are fertilized by the pollen of the caprifigs, the fruit shrivels and drops when one third grown. In other varieties of fruits in which the flowers are exposed any ordinary insect can convey the pollen from the male to the female; but in the fig, all the flowers are inclosed, and it is only through the agency of a little wasp-like insect which makes its home in the caprifig that the pollination of the flowers of the edible fig can take place. The caprifig trees produce a succession of crops during the season, and for every crop of figs there is a new generation of insects.

The first caprifigs make their appearance in March, as soon as the new growth starts on the trees. These figs are in the receptive stage in the latter part of April. The female wasp, which is winged, enters this fig at this time and deposits her eggs in the gall flower, as it is called, and then perishes in the fig to which it has intrusted its offspring. This fig reaches maturity in the early part of June, and at this time the male, or staminate, blossoms are mature and covered with pollen. There are both male and female wasps, each doing its share in carrying on the work to a successful completion. The male wasp issues first from the

galls, crawls (it is wingless) around in the fig, locates the galls in which the female lies, cuts into them with its powerful mandibles, and impregnates the female. The female enlarges the opening made by the male, crawls out of the gall, and then passes through the orifice of the caprifig, which is then large enough to admit of an easy exit. In leaving the fig its body and wings become covered with pollen from the male flowers, which occupy a zone in the fruit immediately surrounding this opening. This is one of the most interesting phases in connection with the growing of Smyrna figs. The caprifigs at this time are plucked from the trees, threaded on reeds or raffia fiber, and suspended in the Smyrna trees. The female flowers of the Smyrna fig are in the receptive stage at this time, and the little wasp forces its way through the almost closed orifice

PACKING FIGS.

of the fig, in many cases breaking off its wings in its eagerness to make an entrance. It crawls around in the fig, passing over the numerous female flowers, trying to find a place to deposit its eggs. The flowers are so constructed that it can not do so. The insect, although prevented from carrying out its object, proves a benefit to mankind, for every fig entered matures into a luscious fruit, with fertile seeds. A few days after an insect has entered, the fig commences to develop and expand, assuming a bright, healthy and vigorous appearance, while the figs which the insect has not penetrated have a sickly, yellowish-green color, and soon drop to the ground. The insect, after performing its function, leaves the fig and dies.

The question now arises as to the manner in which the insect perpetuates its species. All of the caprifigs are not picked from the wild or male trees, as they are often designated. A few of the late maturing

ones of this crop are allowed to remain, and from these the female insect issues and passes into the new crop of figs appearing on the same tree. Here it deposits its eggs in the gall flowers, and thus provides for a new generation of wasps. When this crop is mature, which usually takes six weeks, another crop of figs appears on the wild fig trees, which the insect enters. The final crop, which makes its appearance the latter part of September, remains on the trees all the winter, the insect remaining in this crop in the larva form until the spring crop, already referred to, commences to develop. This, then, briefly describes the life history of this wonderful insect, around which the success of a great and important industry centers.

The only season in the year in which the caprifigs are distributed in the Smyrna fig trees in the month of June. Two or three distributions are made at this time, at a cost, even in an old orchard of ten to fourteen years, not exceeding $1 per acre. From six to ten figs are placed in a tree at each distribution of the caprifigs, the number varying according to the size of the tree. Each caprifig contains from three hundred to one thousand insects.

The Smyrna figs commence to ripen from the middle to the latter part of August, and continue until October 1st. The fact that these figs do not all mature at the same time is a very important feature and one which will appeal to every fruit-grower. It means that a very large crop of fruit can be harvested with a small force of men, or even children, at a minimum expense. These figs must not be picked from the trees, but allowed to drop to the ground of their own accord. This they will not do until they have shriveled and lost their form. Occasionally a fig will be seen which does not drop readily. A slight jar to the tree, or tapping the fig with a light bamboo pole, will cause it to fall. The figs are gathered in small buckets, and later are taken to the drying ground in picking-boxes. Before placing the figs on the trays they are immersed for half a minute in a boiling-hot brine containing about three ounces of salt to the gallon of water. After a few days' exposure to the sun they are taken to a room sealed tight with tongue-and-grooved lumber and placed in a large pile. Here they remain for ten days, being turned occasionally. This sweating, as it is termed, equalizes the amount of moisture in the fruit; overdried figs absorbing moisture from those which are too wet, and vice versa. Before the figs are taken to the packing-house they are washed in a weak cold brine; the overdried figs, called floaters, are removed as they float to the top, and the others are given a good rubbing between the hands. This removes the dirt which may have gathered on them in the course of drying. After exposure to the sun for a half-day, to allow the superfluous moisture to evaporate, they are dumped into boxes and hauled to the packing-house.

The packing is done by women and girls. Every effort is made to have the fruit in the best of condition and perfectly clean. Just prior to being taken to the packing-table the figs are given a steam bath. This cleanses them thoroughly and heats the fruit through, and should any insect have laid its egg in the fruit during the course of drying, the germ is destroyed. No such care is exercised by either the growers or packers in Smyrna, and in consequence the imported figs are sometimes not only wormy, but dirty as well, due to the crude manner of handling.

The figs are packed in pound and half-pound paper cartons, which are in turn packed in wooden boxes holding ten pounds each. So much for our method. Contrast it with the method followed in Smyrna. There the figs are dried on rushes, on an open place in the orchard where a few trees have died. When sufficiently dried the fruit is dumped on the ground in any convenient old shed and allowed to remain until enough has accumulated, when it is gathered in horsehair sacks holding about two hundred pounds each. These sacks are very strong and quite expensive, and are very desirable for the transportation of figs, for they have no lint like burlap sacks. These figs are carried on the backs of camels to the nearest railroad station, a camel-load being two such sacks. A camel train usually consists of from six to ten camels. It is quite a novel sight to see these ungainly creatures shambling along with their big loads, the caravaneer riding in the lead on a small donkey, perched high on a peculiarly elevated and ungainly saddle. During the season the Ottoman railway, which traverses the entire fig district, sends trains daily from the most important point in the Meander Valley, and it is no uncommon occurrence to have from 1,500 to 2,000 tons of figs delivered in Smyrna in a single day. All of the fig-packing is carried on in Smyrna, a city of 400,000 inhabitants, and located on the coast about forty miles from the fig districts. The figs, on reaching Smyrna, are again conveyed on the backs of camels to the fig bazaar, or to the packing-houses if they have been sold to any particular packer. They are dumped on the floor in immense masses about three feet deep. Before packing the figs are sorted into sizes and suppled by women and girls, who receive fifteen to twenty cents a day. The packing is done entirely by men. Neither men nor women are any too clean about their person. A Smyrnaite never eats packed figs. You ask him why, and a shrug of the shoulders is your answer. The only time water touches the figs is when the packers moisten their fingers in the sea water, which is hauled in hogsheads from the quay, into which all the sewers of Smyrna empty.

The Fig in Smyrna.

It is a well-known fact that all imported figs are wormy. Most of the worms leave them while they are in transit, and it is rare that the consumer sees any of the worms in the figs he is eating. It is generally supposed by the packers of Smyrna that this worm is a natural product of the fig, resulting from an egg laid by the fig wasp. However, this is entirely incorrect, for the worm comes from an insect laying its eggs in the fruit during the process of drying.

To produce a good article is always a source of satisfaction, but there must be another incentive. The industry must be profitable. No business can succeed or make any advance unless it pays. The question arises, Will fig-growing in California pay? True, we must compete with the cheap labor of Europe, but this has been the fact in other branches of fruit growing. We are competing in many branches, and our fruit sells in competition with the best that is produced in the Old World. Although our wages are much higher it must be remembered that our help is more efficient, and this, combined with the advanced methods of handling, places us in a position to compete in figs as well as in other fruit.

Commercial Value of Figs.

It has been demonstrated that Adriatic figs at three cents a pound are more profitable than raisins at five cents. Smyrna figs can be raised fully as cheap as Adriatic figs, the only additional expense being caprification; but as this does not cost over two cents a tree at the very outside, it is a matter not worthy of consideration. It is safe to assume that Smyrna figs, even when produced in large quantities, will never bring less than three cents per pound, and for many years to come five cents per pound will be a more likely average. No class of dried fruit outside of the fig possesses so many dietary qualities, and with a good article on the market, there is an unlimited field for expansion. With the figs which were being marketed from this State prior to the successful establishment of the Smyrna-fig industry there was no hope for the future. It is now conceded that this trouble was due to our not having the right variety and to no other cause. It does not indicate, because a fig is of the Smyrna type, that it necessarily is the variety for drying, any more than that one of our June peaches is a good drying or canning peach. Thus far there has only been one variety of any value for drying purposes, and this has been designated as the "Calimyrna." This is the identical variety grown in Smyrna under the name of "Lop Injir," which is the only fig used for export. The name "Calimyrna" is copyrighted, and is a contraction of the two words "California" and "Smyrna." The name Calimyrna has already made its impression on the trade, and is recognized as the only fig grown in California worthy of being classed as a true commercial product.

Fig Land in California.

There are thousands of acres of land in California, in the interior valleys, in which the fig can be grown successfully and profitably. True, the fig will grow any place in the State where the temperature does not go below eighteen degrees Fahrenheit. As a commercial proposition it must have a dry, warm climate during the summer months, and it will therefore always find its most congenial location in the Sacramento and San Joaquin valleys, and in the foothills where such conditions exist. The trees will grow on either wet or dry soils, but a deep warm soil with good drainage will always produce the best fruit. No orchard can be raised with so small an expense as a fig. Good cultivation is of course important, but outside of this and irrigation, the other expenses are very light. Pruning is a small item; no spraying is necessary, for the trees are never subject to attack by insect pests.

The importation of figs into the United States amounts to over $800,000 annually. This alone demonstrates that there is an opening for the development of this industry. There is no fruit which can be put to such a variety of uses as the fig, and the demand for this fruit canned or preserved has never been satisfied, even with the ordinary figs.

THE OLIVE IN CALIFORNIA.

By GEORGE C. ROEDING,
Chief of the Department of Horticulture.

The first olive trees to be planted in California were introduced about 1770 by the Spanish padres. As the padres gradually pushed northward the olive tree continued to be a part of their fruit gardens, its product forming not only an important feature in the culinary department, but having an additional value for use in their religious ceremonies. Some of the olive trees planted by the padres are still to be found at several of the ruined missions, and although receiving practically no care, they continue to yield fruit, bearing ample testimony to their longevity.

The Redding Picholine, deriving its prefix from the name of the introducer, was the first variety of olive sought to be planted extensively in California, it being claimed that it was valuable for both oil and pickles. Experience later showed that it was of no value for the last named purpose, as it was too small. In later years it was grafted over to more desirable varieties. As it adapted itself so well to our conditions, the future seemed to be full of promise for the olive business, and varieties were imported from Italy, Spain, and France. Within a few years these were widely distributed over the State before their commercial value had been fully determined. The invariable result followed. Many growers found they had planted varieties which would not produce well, or which did not fulfill the recommendations of the introducer.

This has been the experience in all lines of fruit-growing in California. The novice always wants to plant a large number of varieties, believing that by so doing he will be assured of a crop, as all of them will not fail to bear. Instead of this being the case, there is never enough of any one variety to make it an object for a dealer to handle the crop. As a consequence, orchards in many instances have been uprooted and other varieties of fruits planted in their place.

Another serious drawback to the olive industry was the infestation of the trees in the coast counties with black scale. This pest has now been overcome by the introduction of the *Scutellista cyanea,* a small parasitic fly which lays its eggs in the scales, the larvæ later eating the scales.

The growers who have remained in the business and who have faith in its future have come to the conclusion that varieties adapted to either oil or pickling purposes are the ones to plant. The Mission olive (the one introduced by the padres) takes precedence over all others, and this is followed by the Manzanillo and Nevadillo Blanco. For pickling purposes alone the Ascolano, Obliza, St. Agostino, and Servillano will no doubt receive more attention as the industry grows. The last named variety is the one so extensively exported from Spain under the name of "Queen Olive."

Olives find conditions congenial to their successful culture as far

south as San Diego, and northward under the very brow of Mount Shasta. However, the interior valleys and a good, warm foothill location seem to present conditions more favorable to the growing of the olive than the coast counties; the trees not only develop faster and produce larger crops, but the fruit averages larger in size and matures earlier, thus escaping injury from frost—a point which must have very careful consideration when olives are grown for pickling. It has been found that olives can not be grown profitably on rocky hillsides; but when planted in a deep, warm alluvial soil, they respond to good cultivation as readily as any other fruit. Where sufficient moisture is not supplied by the season's rainfall irrigation must be resorted to.

In Italy the seeds of a thrifty wild stock are planted, and when large

SORTING OLIVES.

enough are either budded or grafted. The trees are grown exclusively in pots, and it takes about six years before they are ready for the market. In California trees are sometimes grown in this manner, except that the seedlings are planted in the open, in nursery rows, and the budding or grafting is done there, with the result that trees are grown in just about half the time. The most popular method of propagating olives is to grow them from soft wood cuttings, which are planted in sand, either on the bench of a propagating house, or in flat boxes about four inches deep. These boxes are then placed on hotbeds under glass, and after about five months the cuttings commence to make root. The following season they are planted in nursery rows. A four-year-old tree has been found to be the most satisfactory for transplanting to the orchard. The trees should be planted about twenty-five feet apart. In former years closer planting was followed, but this was a mistake, and our horticul-

turists are becoming more and more impressed with the fact that better results are secured when trees are given more room in which to develop.

A properly pruned olive orchard presents a striking feature in our rural landscape; the green of the foliage is so distinct and unlike that of other varieties of fruit trees that the contrast is a most pleasing one. To begin with, the tree should be headed low, not over eighteen inches from the ground, and a systematic method of shortening in and thinning out of the lateral branches should be followed the first four seasons in order to develop a well-shaped, vase-formed head. The prevailing idea that an olive tree requires no pruning is erroneous, for without it the tree sends up a mass of straight shoots, which, if allowed to grow unchecked, will present a bare and unsightly appearance, and the only fruit-bearing wood will be at the tips of the branches, and there will be very little even of this. If the tree has been properly trained while young the pruning in later years will be an easy matter and the fruit-bearing branches will extend from close to the ground to the very top of the tree—an ideal condition.

An olive tree will commence to bear four years after planting, and will be in full bearing in about ten years. Twenty pounds of fruit is a conservative estimate at four years, and this will increase each season until the full bearing age, when one hundred and fifty pounds per tree is a fair average crop. The olive, unlike other fruit trees, does not bear in uniformity. It often happens that with two trees of the same kind and apparently of equal thriftiness, one will be loaded with fruit, while the other will have a light crop. The trees bloom in the early part of May, and when covered with their small white blossoms and prominent yellow anthers present a novel and interesting sight. If one eighth of the fruit sets a big crop will be harvested. The blooming period is the most critical one, and although there is no danger from frost, a high wind or wet weather will very seriously affect the setting of the fruit.

Where conditions have been found to be favorable to olive-growing in California, crops are harvested every season. A failure of the crop is the exception. The harvesting commences in the warmer sections of the State about the middle of September. The green olives are picked at this time, the largest fruit being selected, and the most heavily laden trees are thinned out, as this hastens the maturing of the fruit. An overloaded tree will take fully a month longer to ripen its fruit than one which has only an average crop. Great care should be exercised in gathering olives for pickling purposes, for bruised olives will invariably go to pieces while being processed. The fruit should always be picked in baskets or buckets lined with cloth or burlap. Olives for pickling purposes can not be harvested for less than $20 per ton.

No fixed rule can be laid down for picking the olive, but one point above all others should be borne in mind, and that is not to penetrate the flesh too deeply with lye. Another great objection to our pickled green olives has been the lack of uniformity in color, and when compared with the imported goods, dealers are justified in making this criticism. It has been intimated that the imported olives are colored chemically, but this, in the opinion of the writer, is not the case. The evenness of color is due to the use of limewater. This is easily made by dissolving about three ounces of lime to the gallon of water. After standing for

about twenty-four hours the water is ready for use. In taking the limewater out of the receptacle it should be either siphoned or drawn off, so as not to disturb the lime which has settled to the bottom of the vessel. To each gallon of limewater add three ounces of lye, allowing the olives to remain in this solution until penetrated about a sixteenth of an inch. No further treatment with lye should be given. After being washed with clear water for a number of days, until all vestiges of the lye have disappeared, they should be immersed in a twelve-ounce brine by the saltometer, which strength should be gradually increased to twenty-four per cent. The olives are now ready to be barreled up and rolled away, and except for an occasional opening of the bung, to allow the gases which have formed to escape, and for adding new brine, if any should have evaporated, they will require no further attention. After six months of this treatment much of the bitter principle will be absorbed and the olives are then ready for market. Before marketing, the olives should be placed in a thirty per cent brine and the water used should be either distilled or boiled. Many of the large pickling concerns of the State do not bottle their goods until a year, or even two years, after they have been processed. This then, briefly, is the process for pickling green olives.

The method of pickling ripe olives is much the same, except that it is necessary to give them a second lye bath, the limewater being in this instance eliminated. The second processing is given more for the purpose of securing a uniform, dark luster in the olive than for any other reason, and as soon as the olives have reached this point the liquid should be drawn off. The after processing is much the same as for green olives. In picking ripe olives much care should be exercised to secure fruit which is of an even color. It is an utter impossibility, however, to have all the fruit alike. The processing will do much to secure this, and where it does not the olives must be hand-sorted. The keeping of ripe olives has been the problem above all others which the growers have had to face. The ripe olives being so much softer, difficulties not to be found in the green olive have presented themselves. Experiments in canning have been so successful that this will finally be the solution of this trouble, and canned ripe olives will, within a few years, be an article of trade just as much as canned peaches, pears, etc., are to-day. The ripe olive, wherever introduced, has found more favor among consumers than the hard, woody, green olive, and now that the difficulty of keeping it has been solved this branch of the industry will unquestionably make rapid advances. There is as much difference in the flavor of a ripe olive, as compared with the green, as there is between a luscious ripe peach and a green one. Not only this, but the ripe olive is a nutritious, delectable article of food, while the green olive simply serves as a relish.

Olives for pickling purposes sell for from $60 to $80 per ton, the price being regulated largely by the variety and size of the fruit.

Olives to be made into oil can be handled at much less expense than when they are required for pickles. When being picked for oil-making the fruit is either stripped from the trees, or knocked off with poles having a piece of rubber hose at one end, to prevent the branches being injured. A canvas sheet is spread under the tree and after enough olives have been gathered they are dumped into boxes. No precaution

need be taken to prevent the olive from being bruised. Frozen olives make equally as good oil as those that are not frost-bitten, and the fruit can remain on the trees for a month or more before pressing and there will be no deterioration in the quality of the oil. Frozen olives have less water and consequently are more easily handled by the oil-makers. When the olives are received at the packing-house they are first run through a fanning mill, or an aspirator, to remove all dirt and leaves. Leaves, even if left in, do not seem to impair the quality of the oil. The olives are next crushed by heavy iron or stone rollers revolving in a shallow iron pan, built something on the plan of a large saucer. This crusher may be run by horsepower, but in all modern plants the machinery is operated by either a steam or a gasoline engine; the former is preferable, as the steam can be used for cleaning the plant. In crushing, the pits as well as the pulp of the olive are reduced. It has been found impracticable to do otherwise, and the statement that has been made that an inferior article is produced when the pits are crushed is a fallacy, just as much so as that the virgin oil comes from the first pressing. This is good trade talk, but is never carried out in actual practice. The first pressing is usually light and the resultant product is largely water. Before making the second pressing the pomace is again crushed and then placed in a larger press, which exerts a pressure of about two hundred tons to the square inch. This is followed in some instances by another crushing and pressing. This last pressing is largely a matter of judgment on the part of the man in charge of the plant. The oil and water from the presses are run into settling tanks. Here the oil remains for from twenty-four to thirty-six hours, when it is skimmed off into storage tanks, where it remains until ready for use. These tanks are built of galvanized iron and hold from five hundred to one thousand gallons each. After the oil stands in the tanks for six months it is ready for bottling. If the grower can afford to allow it to stand undisturbed for a year it is better. The oil goes through a sort of fermentation during this time and all impurities settle to the bottom. Before marketing the oil is filtered through several thicknesses of filtering paper to still further clarify it.

One of the most important features to be observed in an olive mill is cleanliness. Olive oil is a great absorbent of bad odors and soon becomes rancid if care is not exercised in its manufacture. A ton of olives will produce from thirty-five to forty gallons of oil. When ready for market the oil is put up in half, one and five gallon tins; also in half-pint, pint and quart bottles. It retails for $2.50 per gallon, and quart bottles are sold for from 85 cents to $1, the price being largely regulated by the size of the bottle used.

California oil-makers take great pride in the purity of their goods and the oil can be relied upon as strictly pure. Oil olives sell for from $30 to $40 per ton. This is not a very remunerative price, to be sure, but olives used for this purpose are those which are small or defective and can not be pickled, so that making them into oil helps to clean up the crop. The great obstacle in the path of finding a ready market for pure oil has been the competition of the adulterated oils either imported from Europe, or prepared by jobbers who make it a business to mix the pure article with cotton-seed, peanut, and other vegetable oils. If our national fruit laws can be so enforced as to compel those

engaged in this nefarious practice to label their bottles, showing the true content, it will do much toward building up a business in California. If properly advertised, olive oil for medicinal purposes alone would be in great demand, for it will do more good to poor, suffering humanity than all the nostrums so universally used and so vigorously pushed to the front. Advertising and putting up a thoroughly good and reliable article will do more to build up the business and develop it than any other one thing that can be followed.

California fruit-growers are persevering; they have overcome difficulties in other branches of the industry. Have we not every good reason to believe that they will be equally successful in the development of the olive business? We have not only our own market open to us, but there are also other countries where the charmed name California will cause the gates to be opened wide to admit this great health food from our sunny clime.

CALIFORNIA WINES.

By PERCY T. MORGAN,
President California Wine Association.

The wines of California have attained a world-wide distribution. They are exported to many European countries, to Central and South America, India, China, and Japan; to the Hawaiian Islands, the Philippines, and they may even be found along the Nile.

The first grapes from which wine was made in California were grown by the Spanish padres, who reached the Pacific coast from Mexico in 1769 and soon dotted what is now the State of California with their missions. Around these missions, to supply the wine which from time immemorial they and their predecessors had considered the United States, and largely replaced the imported product.

In 1849 the lure of gold attracted many thousands of people of all nationalities to the new possessions of the United States on the western slope of the continent.

It was not long before the adaptability of the soil and climate for the raising of grapes for the making of wine came to be recognized, and about the year 1854 vineyards were planted for producing wine on a commercial scale. In the next decade the proprietorship of vineyards became a very popular enterprise.

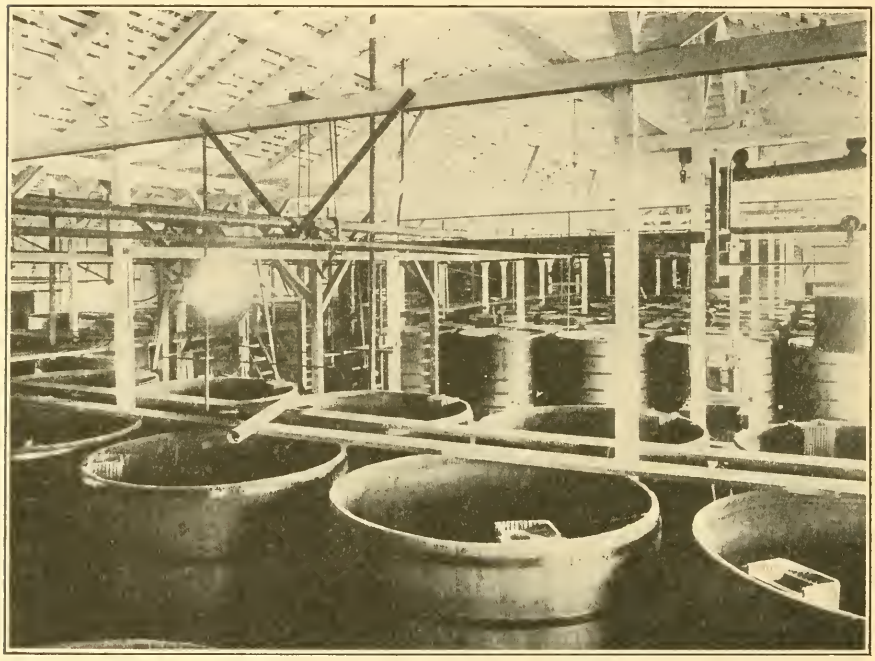
The marketing of the product of these vineyards was at first a matter of some difficulty, for the reason that California, at that time, was without railroad connections with the more heavily populated Eastern States, which were largely supplied from Europe. With the advent of the railroad, however, the California wine business soon assumed importance and gradually found favor with the wine consumers of the United States, and largely replaced the imported product.

By 1880 the consumption and export of California wines had grown to about five million gallons; in 1890 to about twenty million gallons;

in 1900 to about thirty millions; and at this time the average annual production of wines in California exceeds forty million gallons.

The region around the Bay of San Francisco, consisting of the counties of Sonoma, Napa, Contra Costa, Alameda, Santa Clara, and Santa Cruz, is admirably adapted to the growing of wines similar to those of the Bordeaux and Burgundy types of France; the Rhine and Moselle types of Germany, and the red and white wines of Italy.

In the interior valleys of the San Joaquin and Sacramento, and in the region around Los Angeles, most excellent wines of port, sherry and



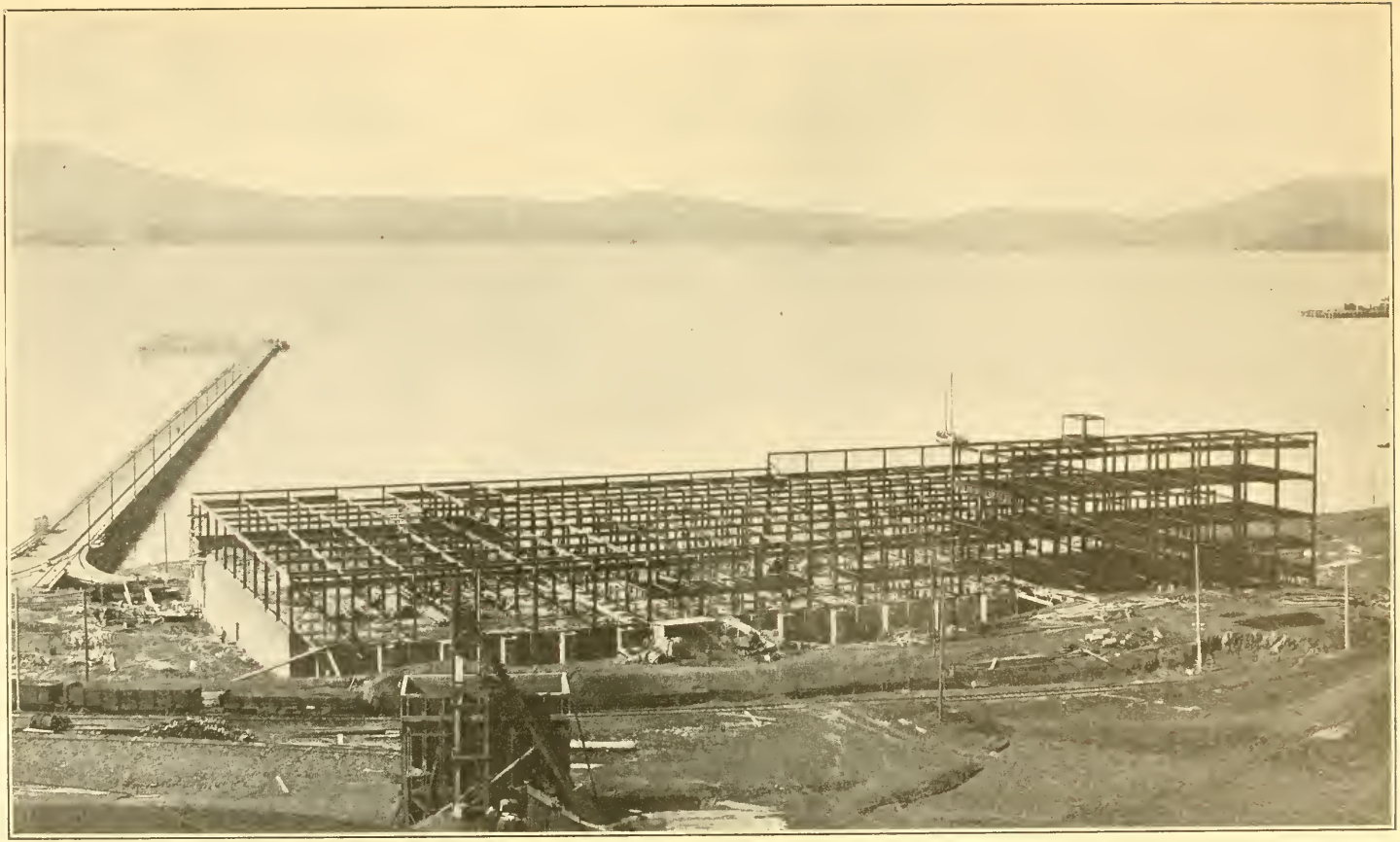
FERMENTING TANKS.

other sweet wine types like those of Spain and Portugal are successfully produced.

The maturing and handling of California wines necessitates the employment of very large capital and it is estimated that the vineyard interests of California, with their collateral industries, represent an investment of over one hundred million dollars.

The area in California planted to vineyards is in the neighborhood of 270,000 acres, and the establishments for the care of wine are among the most extensive and complete in the world.

The Winehaven cellars of the California Wine Association, which concern has ten million dollars invested in the California wine industry, are located on the bay of San Francisco, about an hour's steamer ride from the city. The buildings are of steel and concrete construction and are designed for a storage capacity of ten million gallons of wine.



GREAT STORAGE PLANT IN COURSE OF CONSTRUCTION FOR CALIFORNIA WINE ASSOCIATION AT WINEHAVEN. MOUNT TAMALPAIS IN DISTANCE.

All the transcontinental railways connect with this plant and the deepest ocean going vessels can load at contiguous docks.

About fifty winery plants, scattered through the wine-producing section of California, are operated under the direction of the California Wine Association, and the magnitude of its operations can be judged from the fact that in the great vintage of 1902, over 225,000 tons of grapes, producing upwards of thirty million gallons of wine and brandy, were crushed in these plants.

The influence of the California Wine Association, since it was incorporated some fifteen years ago, in the upbuilding of the California wine industry has been very marked and its financial strength and enterprise have greatly encouraged the distribution of the wines of California.

The Calwa brand of bottled wines, matured in the cellars of the California Wine Association, have attained a very high standard of quality and a reputation which is fast being recognized all over the country.

Many other large concerns are engaged in the California wine trade, among which may be mentioned the Italian-Swiss Colony with its Tipo Chianti brand of wines; Lachman & Jacobi; C. Schilling & Company; Wetmore-Bowen Company, which deals exclusively in the Cresta Blanca brand of bottled wines; Gundlach-Bundschu Wine Company; the California Winery, and several others which have in more recent years entered the California wine trade.

In the wine districts other wineries, numbering several hundred, are operated, the majority being of small capacity for crushing the yield of individual wineries, but some also of considerable magnitude make wines for sale to the numerous concerns engaged in the distribution of California wines.

With the magnificent climate so splendidly adapted to the growing of wines, and the vast amount of capital engaged in the business, together with the skill which has been attained in more than fifty years of experience in wine-making in California, this industry is destined to become not only one of the largest in the United States, but also, in its exports, a formidable competitor with European wine-growing countries.

SPECIALIZING IN THE DAIRY BUSINESS.

By Wm. H. SAYLOR,
Secretary of the State Dairy Bureau.

Two of our noted captains of industry have lately attracted attention through utterances that are remarkable for their divergence. Mr. James J. Hill, the railroad master, speaking to those in quest of business success, tells us "not to put all of our eggs in one basket." Mr. Andrew Carnegie takes the opposite view, but admonishes us to watch that particular basket. In the way of business philosophy there may be good sense in both views. Advice in anything is valuable only as it fits the

person to whom it is given; but without questioning the wisdom of Mr. Hill, the progress that has been made in the world comes very near substantiating the logic of Mr. Carnegie—that the greatest measure of success comes from specialization.

In agriculture no less than in other industries the tendency is to specialize, and the agricultural enterprises of California stand out conspicuously in this respect. Here we have the farmer specialist—the cereal farmer, who devotes his energies and resources to growing grain; the cattle raiser, who knows nothing but cattle; the sheep raiser, who pins his faith to sheep alone. But it is in its more intensified farming that California is developing its most successful specialists. We have the orange grower in the south, who understands his business with a thoroughness and intelligence that sets him in the very first class of agriculturists. We have the vineyardist, the celery grower, the asparagus grower, the bean farmer, the nut raiser, the hop farmer, the exclusive hay farmer, and so on down the line. The farmer settler, it seems, comes to California, looks about, finds a locality that appeals to him, investigates what it will produce to best advantage, and then goes in to work out success along that line.

In dairying California is the only State that can claim distinction for having a class of farmers who can be strictly termed dairymen. In other states dairy products come from cows that are a part of a system of mixed farming. The farmer of the past tried to produce about everything that was required to sustain his family. If there was a surplus it was sold. This is the class of farmer in our Eastern States who milks a few cows, generally of but ordinary adaptability to dairy usefulness, makes a product of indifferent quality or helps to sustain a public creamery or cheese factory. In the aggregate this class of farmer is so large that it meets the demand for the variety of what it produces. But with this class there is not the highest degree of excellence. In the dairy line on these general farms you find cows of indiscriminate breeding and not best adapted for dairy purposes. The equipment is crude, the method of feeding is not scientific or economical, and sanitary standards are low.

But in California, dairying is on a different basis. The cow-keeper is a dairyman, a specialist, and all his interests and resources are in his herd. As success comes to him he expands his operations; but he seldom branches out into other lines of farming. What he wants is more land and more and better cows.

California is a land of big things in dairying, as it is in so many other lines of enterprise. One estate, divided up into a number of dairy farms, owns nearly two thousand cows. There are several dairies doing business with a thousand cows under a single ownership, and there are over eight hundred dairy farmers who have herds numbering from one hundred to one thousand cows, and approximately three thousand whose herds number thirty-five or more cows. Eighty per cent of the total dairy product of the State comes from this class of dairymen, while in the older dairy states eighty per cent is produced from herds of less than thirty cows, or in other words, from those who engage in mixed farming.

While California has been evolving a class of farmers who make a specialty of the dairy business, she is also evolving the most perfect dairy appliances, conveniences and methods. With unexcelled feed in the form of alfalfa, the State is developing the most efficient herds in the world. With specialization in dairying has come the Holstein-Friesian and the Jersey cow. Like the benefactor who makes two blades of grass grow where one grew before, the special bred type of dairy cow is giving two or three pounds of butter to one from the inferior animal that is the result of mixed farming.

Under this system of specialization and our incomparable forage, let us take a glimpse at the development that has taken place in the dairy industry of California. For ten years an effort has been made annually by the State Dairy Bureau to ascertain the output of dairy products. During this time there has been a growth in butter production (for which branch of the industry the State seems best adapted) from 23,691,028 pounds in 1898 to 48,469,585 pounds in 1908. When we study this growth in detail we are more impressed with the development that has taken place than casually appears. We find that it has been chiefly confined to irrigated sections, and especially to counties in the valleys of the San Joaquin and Sacramento rivers. Here with an abundance of alfalfa, which by irrigation may be kept green throughout the year and fed green for at least nine months, the dairy business has boomed. Taking Fresno, Kern, Kings, Merced, Sacramento, San Joaquin, Stanislaus, Tulare and Yolo counties, we find that as recently as 1900 their combined output of butter was only 4,131,882 pounds. The output has grown in eight years as follows:

Year.	Pounds.
1900	4,131,882
1902	5,819,451
1904	10,901,490
1906	16,310,445
1908	19,759,370

A fair annual yield of alfalfa hay is six tons to the acre. Leaving out also the indigestible parts, we find that an average acre will yield 1,320 pounds of digestible protein, 4,752 pounds of digestible carbohydrates, and a small amount of digestible fat. It is these digestible nutrients that count in milk production.

Feeding authorities tell us that it requires on the average 1.87 pounds of digestible protein and 12.35 pounds of digestible carbohydrates to produce one pound of butter fat. Hence we are able to deduce that the 1,320 pounds of digestible protein produced from an acre have a potential butter-fat value of 720 pounds a year. At thirty cents a pound this means $216.00. As the same alfalfa furnishes in addition almost enough digestible carbohydrates, this need not be calculated separately. But the cow can not transform these nutrients into milk without some loss. There must be some waste in the transformation. Her body must be nourished. The extent of the loss must depend upon the transforming efficiency of the cow. Herein lies the field for the special type of dairy cow and for the special, well-trained, and enterprising dairyman.

Cows are kept for the purpose of transforming vegetation, inedible by human beings, into an edible article of human food. The protein,

carbohydrates, and fat in alfalfa, grass, hay, and all forms of fodders are chemically the same as those in milk, but they must be transformed to make them of food value. This is the dairyman's business. He must transform the nutrients in his fodder into milk nutrients with a minimum of loss. He benefits by his special knowledge and experience. He must have cows of the highest efficiency in transforming fodders, and all the best appliances, machinery and methods that tend in this direction. This is the class that is producing the dairy products of California—dairymen in the full sense of the word.

POULTRY-RAISING IN CALIFORNIA.

By L. C. BYCE,
President of the Petaluma Incubator Company.

In the early days of California following the gold excitement, a family which constituted part of an emigrant train that crossed the plains, brought with them, in addition to horses and cattle, a few hens. The latter, while en route, were allowed their freedom in the evening, after the party had struck camp, and later on as the hens settled upon the wheels of the wagons or other suitable place to roost for the night, were carefully tucked away in their coops, only to have this repeated over and over again. Arriving at a California mining-camp every evidence of civilization, including the chickens, was welcomed. A good flock of hens at the time above referred to would have been equal to a gold mine, for the family owning these hens found ready sale for every egg at almost fabulous prices, as high as $6 in gold dust being paid for a single egg.

The luring sight of gold and its quest soon caused the chickens to be forgotten, and but few people interested themselves, and then only in a small way, until in the seventies. Previously no thought seemed to be given to the poultry business as a commercial proposition or as a means of livelihood, although late years have fully demonstrated that golden opportunities were lost. The writer, who was also engaged in perfecting a system of artificial incubation, imported from many of the Eastern poultry yards large quantities of fowls, disposing of them in small numbers, which became widely scattered, and by encouraging those of limited or small means there has grown up a business of such magnitude as to be almost beyond the conception of the person hearing of it for the first time.

Immediately surrounding Petaluma there are over one million laying hens, making it the greatest poultry section of the world.

It requires a more vivid imagination than that of the writer to adequately set before the eyes of those who have never visited this section of the country a pen picture of the poultry business as it is carried on here; neither can it be properly pictured by the camera in one general view on account of the hills between which nestle so many beautiful valleys admirably adapted for the purpose. Standing upon one hilltop

from which, looking across a very narrow valley dotted with white poultry houses surrounded by White Leghorns in such numbers that even at a short distance certain spots are almost as white as though covered with snow, can be heard arising the combined cackling of 125,000 hens, the mighty chorus of which is pleasingly suggestive that the busy hen is adding to the accumulating riches of her owner.

Shipments last year from Petaluma amounted in round numbers to 4,500,000 dozen of eggs and 60,000 dozen poultry. These figures do not include the eggs for table consumption nor for use in incubators. Add to the above 2,000,000 eggs used in the large hatching establishments, which ship one day old chicks, and about 5,000,000 used by various poultrymen in raising birds to replenish their flocks, and one can very readily estimate what is being done in a single community, the output of which brings $5,000 per day to those engaged in the business.

POULTRY FARM OF THREE THOUSAND HENS.

The total receipts of eggs in San Francisco last year is given as 14,138,424 dozens. In comparing figures it will be noticed that the Petaluma shipments amounted to one third of the quantity, and when we add the products of Santa Rosa, Healdsburg, Cloverdale, and other towns in the county, it is found Sonoma County furnishes just about one half of all eggs shipped into the San Francisco market.

Recent organization among the producers and a system adopted for grading eggs has given encouragement to more careful methods. Prices of eggs at the time of writing are for first grade 56 cents per dozen, and 40 cents for seconds, with a prospect of going still higher.

Several of the coast counties south of San Francisco, Los Angeles, and one or two other counties in the southern part of the State, and the great Sacramento and San Joaquin valleys are fast coming into prominence as poultry-raising sections, and even a number of places away up in the Sierra Nevada Mountains.

The valleys of California that are well sheltered by the mountains and have an abundance of good water are admirably adapted to poultry-raising, and on account of conditions the smaller valleys are the best adapted. The growth has been enormous during the past decade. Hundreds of families of limited means have acquired small places and engaged in the poultry business, and are not only realizing a fine livelihood, but many have bank accounts of no mean proportions.

The prospects for success are more promising than in the East or northern latitudes, for the climate precludes the necessity of extremely

warm housing; hens run out every day in the year, hence have free and unlimited exercise; snow in the valleys is a phenomenon; the rains of our winters are beneficial to the fowls rather than a detriment to them, for it is then that vegetation is at its height.

Prices obtained for eggs and poultry average high, and although many are engaged in the business, yet there is room for hundreds more, for the home production meets but little more than half the demand, and at the rapid rate at which California's population is being increased the demand for poultry and eggs is also increasing. Several hundred carloads of eggs and live poultry are sent from points in the Western States to the Pacific coast markets during a year, usually to San Francisco and Los Angeles, to make up for the large deficiency in home production.

One peculiar and withal very desirable feature of poultry-raising in

WHITE LEGHORNS.

California is that large numbers of fowls may be allowed to roam together in perfect health without fear of disease being contracted. Such conditions in any other part of the world invariably mean disaster to the flock, and this is another feature which greatly adds to the profit side of the poultryman's account. Some of the valleys present the appearance of one vast poultry farm, and upon ascending a prominence overlooking the same a scene is presented that would make an Eastern friend realize at a glance what superior advantages are possessed by the California poultrymen. A soil unequaled, a climate unapproached; the best and purest water in numerous places running down from the mountain sides; a sunshine warm and invigorating, but never too hot; natural green feed the year around, and no cold or rigorous winters, necessitating specially constructed and oftentimes artificially warmed poultry houses—is it any wonder that California is fast becoming known as the poultryman's paradise?

One will naturally ask, Is it possible for any person to make a failure under all the favorable conditions? To which we answer in all sincerity and truthfulness, Yes, there are failures, by those who have sought this line of business on the ground that "any one can raise chickens," and having failed in everything else, tries the one business of all which any one can conduct, according to his statement, and fails, because instead of managing it right, mismanages as he has done in other lines, while his neighbor with the same class of fowls and on similar land and in the

same glorious climate, and using the feed that the market affords, continues to swell his bank account.

While the majority of those engaged in the poultry business keep flocks of hens for laying purposes (and the White Leghorn variety is used almost exclusively), there are others near the cities devoting their energies to duck raising, while others in the interior where there is plenty of range, raise turkeys in immense numbers, so that boys or men herd them during the day, much as a shepherd does his sheep. The writer has seen a flock of twelve hundred turkeys in charge of a boy with saddle pony and dog, and has been told of many large flocks in the Sacramento and San Joaquin valleys. A very extensive duck-raiser near San Francisco informed me that during eleven months of last year

SMALL POULTRY FARMS WITHIN CITY LIMITS OF PETALUMA.

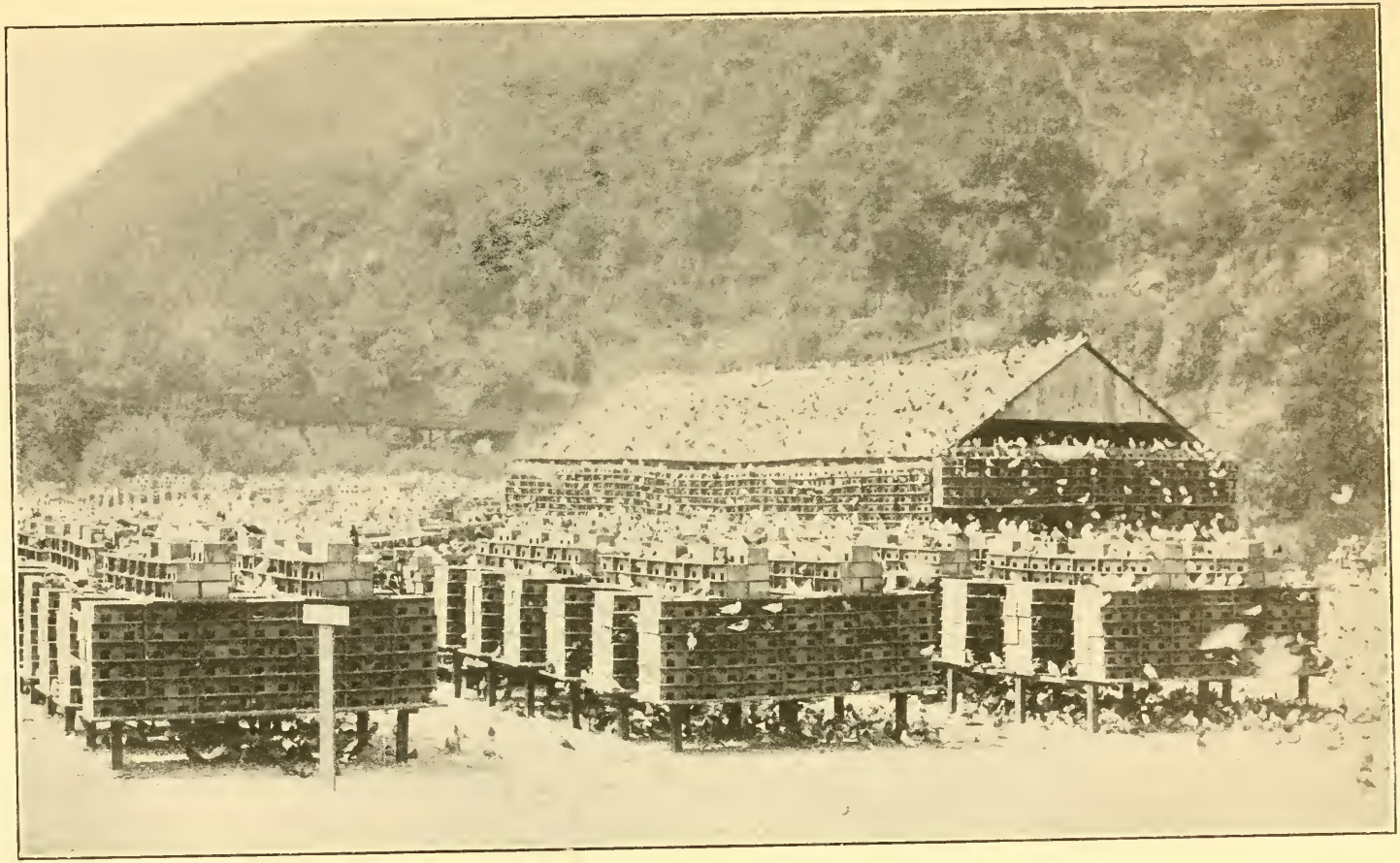
he hatched and got ready for market 49,800 ducks and 1,485 chickens, and sold off the ducks at eight and ten weeks of age, 10,000 at $1 each to the Chinese population, while the others brought from $6 per dozen to occasionally $12.

Here are also figures given by some who are conducting the poultry business in only a limited way. One man reports the following:

"I send you the result of a single year's work with 296 hens. Eggs and broilers sold, $1,110.12; gross cost of feed, $195.35; net, $918.76. Have had the hens divided into two yards, occupying about five acres of ground."

Another man reports as follows: "From a flock of 500 hens I have sold 3,723 dozen eggs, averaging 31½ cents per dozen, $1,170.98; 145 broilers at 42½ cents each, $61.35; 200 pullets at 50 cents each, $100.00; total, $1,332.33, from which deduct for feed of various kinds, $400.00, leaving a net profit of $932.33."

Hundreds of such instances as these could be given, but it is always safe to estimate on what the average person is making. It is placing a very low estimate to say that any person can count on a net profit of $1 per hen per annum; in fact, the writer does not know of any one who is not doing better than this.



SQUAB FARM NEAR LOS ANGELES.

From an old copy of a San Francisco paper, the "Pacific Rural Press," the following is taken: "That truth is stranger than fiction is deeply impressed on the judicious observer who visits Petaluma for the first time and takes note of the wonderful magnitude of the poultry industry. Twenty-six years ago Mr. L. C. Byce, now President of the Petaluma Incubator Company, settled in the quiet country village up the creek and determined to make it the greatest poultry center in the world. Working alone at the carpenter's bench, he began the manufacture of incubators, which have now become so justly famous. At that time there were few fowls in the State, but Mr. Byce's dream has been realized.

SCENE ON A CALIFORNIA POULTRY RANCH OF 8,000 HENS.

The entire country surrounding Petaluma teems with chickens, nearly all White Leghorns. The 'ranches' are small, usually consisting of five and ten-acre tracts. The number of fowls owned by each farmer ranges from 500 to 8,000. Climate, soil, locality, price of feed and access to market all contribute to the success of the industry, and hundreds of men are establishing themselves on little ranches, with the assurance that financial independence waits on intelligent management, industry, cleanliness, and perseverance."

One might infer from the above that a man can keep 8,000 fowls on a piece of land not to exceed ten acres; such, however, is not the case. All of the poultrymen in the vicinity of Petaluma who keep from 5,000 to 8,000 fowls have from 200 to 300 acres of land, on which the fowls roam at large, the colony system being employed; but there are those employing the yard system, who keep as large a number of fowls on

twenty to twenty-five acres of ground. Each plan has its advocates, and there are many who are making good money on both plans. It is not so much the system as the ability of the man to handle the business.

Much has been said and written on the poultry industry of California, of the wonderful adaptability of soil and climate to the successful and profitable conduct of the business, and although hundreds of people have been attracted to the State to engage in poultry-raising, yet the output comes so far short of meeting the demand that there is room for

LOAD OF 3,000 PETALUMA CHICKENS.

hundreds more. San Francisco is, of course, the leading market, but in many other sections the local market, owing to existing conditions, is as good as that of San Francisco. The large number of vessels engaged in the transpacific trade leaving the port of San Francisco; the demands of the various and almost innumerable mining and lumber camps; the endless summer and vacation houses, and the monster hotels for tourists, all require enormous quantities of poultry and eggs, and California poultry-raising must either produce the same or consumers will still have to look to the Western States to furnish them. It does not require much thought or investigation of the subject to determine how much more preferable is the fresh California product, and that should point the moral that there is room for more producers.

THE HONEY INDUSTRY OF CALIFORNIA.

By GEORGE L. EMERSON.

Bee-keeping and honey-making in California differ materially from the same vocation elsewhere. The man who does not have two hundred stands or more is scarcely recognized as an apiarist; and when they speak of honey it is nearly always in tons rather than in pounds. There are a good many men in the southern part of the State who care for five hundred colonies or over; that is, they do the expert work and their assistants take care of that part which can be left to those of less experience.

It is counted that a good apiarist can do all the work for two hundred stands of bees; while the same man, with the help of a green hand for two months, will manage about three hundred stands. Mr. Mendelson of Ventura handles fifteen hundred and sixty colonies with hired help, and makes both comb and extracted honey. Mr. Mercer, also of Ventura, cares for twelve hundred colonies, with the assistance of two men during the busy season. But few men could hope to attain the knowledge necessary to care for so many bees.

Southern California is literally the home of the bee. They can be found in the trees, rocks, houses, and even have been known to build in the branches of the orange tree exposed to the open air and there store in the summer under those conditions quite a number of pounds of surplus. Houses are favorite haunts, especially schoolhouses and churches. They will go into the roof through the shingles, or around the windows they may find access to space between the studding; or perhaps they may find a way to the inside of the cornice, and even the chimneys—these they often choke up with honey until smoke refuses to take its wonted passage.

During a good season all these wild bees swarm repeatedly, and the consequence is that they are found in all likely and unlikely places. It is a common thing for a man who knows how and is willing to spend time to shake such swarms into a box to gather anywhere from twenty-five to one hundred swarms in a single summer. These bees are generally hived in anything that comes handy. I have bought them myself in anything from a bureau-drawer to a sugar-barrel, the prices ranging from 50 cents to $3 in hives. Bees in hives suitably located sell at from $3 to $5 per stand, and if the man is an experienced bee-keeper it pays to buy them in this condition; but if he is short of money he can gradually work into the business by making his own hives, buying cheap bees, and transferring them, catching stray swarms and taking them out of buildings, etc.

The writer and his brother own one thousand stands of bees, located in eight modern apiaries. Two years ago we produced sixty-five tons of extracted honey; last year we got forty-five tons. Taking the two years together I do not think that they could be considered better than average years. This would make an average of fifty-five tons per year.

The honey sold at from 4½ to 6½ cents per pound, according to grade and market, but for convenience let us say the price was 5 cents, or $100 per ton, which is $5,500 per year. Two thousand dollars will cover the total expense. This leaves $3,500 net, and five months in which there is practically nothing to do except visit the apiaries once a month and see if everything is all right. We have not spent more than an hour's time a month at each apiary during the past winter, or from the first of October to the first of March, and our bees wintered splendidly.

There are some men who produce comb honey exclusively. Others produce both comb and extracted honey, while the majority prefer to handle only the extracted. I believe this to be a question for each man to settle for himself, as there are many different things to consider; but one thing is certain—it does not pay for any one to produce poor comb honey. The cost of production is equal to, if not more than, if it had been made when there was a good flow of honey, while the selling price may be reduced to one half what a fine white comb of full weight will bring. In the extracted it does not vary so much. The extremes are not more than two cents per pound on the same market.

Some of the readers of this article may want to know about the flora to which we look to furnish feed for our bees. There are so many varieties of honey-producing plants and trees that space will not permit of a description or even the mention of all of them. Some of the most prominent are the black, white, and purple sages. [We claim that the black, or button, sage, as it is sometimes called, makes the finest honey in the world.] Wild buckwheat, wild and cultivated alfalfa, also some of the immense bean-fields, furnish many tons of white honey for our bees. There are so many varieties of honey-producing shrubs that the ordinary bee man simply says of a certain one when he sees it, "Yes, that is all right, my bees work it," and never thinks of trying to find out the names of them all.

Among the trees the orange and eucalyptus are most valued, but the greater portion of plants and trees in this part of the country have some kind of a flower and the bees will work them according to their value compared to other flowers out at the same time. The black sage not only produces the best honey, but under favorable circumstances the flow is so heavy that bees will not touch anything else while it is at its height. I have seen an apiary of three hundred stands, in ten-frame Langstroth hives, fill every available space in four days and cap it solid. This shows how heavy-bodied it was when gathered, for ordinary honey has to stand in the combs a number of days before it is ripe enough to cap. This same honey was so white that you could not, while standing off a few feet, tell the difference between a tumbler full of it and another of water. We have kept it for four years in a Mason jar without sealing, and it did not granulate. When California has a really large crop, that is the kind of honey that perhaps one half of it will be, while the rest will either come from other flowers or be mixed with them enough to make a decided change in color and flavor.

We roughly estimate that California can produce five hundred cars of fifteen tons each in a good season. This was done years ago, while we now have more bee-keepers and better ones, more bees and better

facilities for handling them; and yet I prophesy that in a few years we will look back and see how small we were at this time; for there are unlimited acres of mountainous territory in this great State covered with a jungle of tangled shrubbery (that can only be penetrated by the smaller animals) that breaks out into a profusion of bloom that is enough to gladden the heart of any lover of nature in its wild and unfrequented state; while it will certainly not only put the bees within its reach, but the bee-keepers themselves, to swarming.

My friends, the Eastern bee-keepers, if you are tired of chaff hives, or cellar wintering, or shoveling snow to get a path to the road—of working six months to prepare a living chance for the winter—follow the path and advice of thousands of others and come to a climate where bees have been known to swarm every month in the year; where the roses bloom in the winter and the children run barefooted all the year round. There is plenty of room for more, even if we are the largest producers of honey in the Union, and the chances are better now than ever before, for we have the California National Honey-Producers' Association to buy our supplies at the cheapest, sell our honey on a favorable market, and protect our interests at large.

CATTLE-RAISING IN CALIFORNIA.

By PETER J. SHIELDS.

The breeding of live stock in California has many features peculiar to itself, and may well be said to be in a formative condition. The breeding and ranging of cattle of both the beef and the dairy varieties are in a condition of adjustment, and the next ten years will witness many material changes in the manner in which they are conducted.

California is probably the only one of the Middle Western and Pacific Coast States which does not produce all its dairy and beef cattle within its borders, and at the same time ship cattle for slaughter. This condition is the more remarkable when taken in connection with another fact, which is that California is the best fitted by reason of soil, climate and food products to produce cattle economically of any State in the Union. The reasons for this underproduction are many. California is not an old State, nor is its population dense. There is almost an entire absence of the small breeder and of small herds bred and fed upon the farm. The chief reason, however, is that California's energies have been exercised in other directions, and she has subordinated her beef-growing and dairy industries to others which she has carried to a high development. Her first great industry was mining, and she produced more gold than any other State in the Union, or other subdivision of the earth. Wheat-growing followed, in which she took high rank, especially excelling in the use of agricultural machinery. Horticulture succeeded, and in this particular she is without a parallel. Cattle-breeding has waited on these industries; but in the progress of events

the day of the cow has come, and the next few years will witness a development and perfection in the breeding of high-class cattle which will compare with her present horticultural preëminence.

At the time of the acquisition of the territory of California by the United States in 1848 large herds of cattle of the Mexican type roamed over her foothills and valleys in almost a wild state. They were slaughtered chiefly for their hides and tallow, which were purchased by traders plying vessels along the coast. Following the American occupation these conditions did not rapidly change, and some features of them still remain. The cattle-breeding industry of California is still distinguished by the large holdings of land, the vast herds and the great ranges. The ranges of such breeders as Miller & Lux and the Kern County Land Company easily exceed one million acres each, while ranges of nearly equal extent are owned and used by Cox & Clark, Vail & Gates, J. V. Vickers, The California Agricultural and Pastoral Company, the Howard estate, and many others. California, however, is not exclusively a range State. A very large number of cattle are bred and fed on irrigated alfalfa ranges in the central and southern San Joaquin Valley. Many cattle, too, are grown on the alfalfa fields in the Sacramento Valley, where, on the moist rich lands along the rivers and on the irrigated tracts, alfalfa grows to perfection; and wherever this incomparable crop is grown animal life takes on its highest development.

The number of cattle in the State is difficult to determine, the census returns from California being probably less reliable than those from other states where the holdings are smaller and the herds much more numerous. A study of the returns shows that the number of cattle is only slightly increasing under the range system. And it is not probable that it will increase. We must look for increase only as the result of the spread of irrigation, the growing of more alfalfa, the subdivision of large holdings, and the advent of the farmer breeder and feeder. In 1860 California ranked sixth among the states as a cattle producer, reporting 1,180,142 head. In 1870, she fell to eleventh place, reporting less than two thirds as many cattle as ten years previously. She showed little increase in 1880, by which time she had fallen to the rank of twenty-first among the states. In 1890 she reached her highest mark, when she ranked thirteenth with 1,367,118 head. By the census of 1900 she had fallen to seventeenth place, and the number of cattle had declined to 1,115,194 head. While these enumerations are probably under the correct figures, they clearly show that California has been developing her other industries at the expense of cattle-breeding, and that it was chiefly from progress in other lines that she has obtained her high rank among the states as a producer of wealth. In the United States there are 17.64 head of cattle per square mile, while in California there are but 7.15 head, she ranking fortieth among the states and territories.

To determine what percentage of the cattle used and consumed in California are bred and grown in the State is difficult. The best advices at the writer's command lead to the conclusion that not more than forty-five per cent of the cattle slaughtered in California are home-bred and grown.

There are slaughtered in San Francisco each month about 15,000 cattle, at Los Angeles about 9,000, at Sacramento about 1,000, at Stoek-

ton and Fresno about 800 each, and at other places in the State such an additional number as brings the monthly average up to about 50,000 head. To supply this demand there are annually brought into the State from the Republic of Mexico, Texas, New Mexico, Arizona, Oregon and Nevada about 350,000 head. Of this number about 150,000 come from Oregon and Nevada, about 150,000 from New Mexico and Arizona, and the remaining 50,000 from Texas and Mexico.

The grade of the cattle slaughtered in California is not at present as high as that of those which supply the great cattle markets of the Middle Western States. They are very largely range cattle and occasionally show in addition to the ordinary range characteristics some slight traces of their Mexican ancestry. Considering their breeding, however, California cattle are unequaled, as the favorable climatic conditions under which they grow produce an excellence unapproached by animals no better bred. The use of pure-bred bulls upon the range is largely increasing, and range cattle are showing a marked improvement in size and quality. When they have been graded up to the breed standard of Eastern cattle, they will be of greatly superior individuality and merit, owing to the richness of the California grasses, and the climatic conditions being so favorable to growth and development. The cattle brought into California from Arizona, New Mexico, Texas and Mexico are most frequently Hereford grades and show more or less the characteristics of that breed. The Oregon and Nevada cattle have been generally Shorthorn grades of good type, but in recent years the cattle from these states show a strong infusion of Hereford blood. Of the home-grown cattle of California about two thirds are produced south of San Joaquin County and about one third north of that place. These cattle are chiefly of the Shorthorn type, being grades of that breed upon the native cattle.

The first improvement of our cattle, however, was through the use of "American" cattle brought across the plains in pioneer days. These animals were undoubtedly mostly grades of some of the improved breeds. The cattle of the northern part of the State are of marked superiority over those farther south, owing to the much larger number of pure-bred sires having been used by the northern breeders. This larger use is attributed to the annual exhibitions of fine cattle at the State fairs at Sacramento, surrounding which city the superiority is most marked.

Dairy Cattle.

In cattle classed in the census as "milch cows" California ranks somewhat better than as a producer of beef animals. While she occupies the same rank, being seventeenth in each, she compares more favorably with the states ahead of her. The last census credits California with 307,245 milch cows, being about one fifth as many as New York and Iowa and one third as many as Illinois, Pennsylvania, and Ohio. Dairy statistics of California will be given elsewhere; it will be sufficient here to say that the quality of the dairy cattle of this State is not as high as that of other states which have specialized along dairy lines, and that until recent years the breeding of dairy cattle has experienced the neglect incident to our more general attention to other industries. As to breed, the native or common cow predominates among our dairy cattle, although a very large percentage of them give indications of more or less improved

blood, Shorthorn predominating. Jersey blood is very generally evidenced, with Holstein showing an increasing popularity. While the general average of California's beef and dairy cattle is not high, the contrary is true of the pure-bred cattle within her borders. The great fortunes which our pioneer citizens accumulated in the mines, in railroad construction, fruit- and wheat-growing, enabling them to indulge their taste for fine-bred animals, and early in our history and constantly since some of the choicest animals which money could buy have been purchased for California. Many famous herds have been collected, and from their increase, and as a consequence of their dismemberment and sale, many smaller herds are now scattered throughout the State, representing the best types of the various breeds. These herds have been well maintained, others are constantly being established, and California may safely be said to be on the verge of a great cattle-breeding development.

Pure-bred Cattle.

Shorthorns were first of all the varieties of pure-bred cattle to be introduced into California, and have always remained favorites with our beef-breeders and dairymen. Among both our beef and dairy cattle the Shorthorn cross is most frequently encountered, and to it we are probably most indebted for what progress we have made in improving our cattle. The first known introduction of pure-bred Shorthorns into the State occurred in 1858, although well-bred animals had previously been brought in by immigrant trains across the plains. After this, importations were steady and frequent, until now the blood of this royal breed is well distributed and in the hands of aggressive and intelligent breeders. At the present time twelve or fifteen large-sized breeding herds exist in the State, representing all of the most prominent families, domestic and imported, including a number of herds of high-class milking Shorthorns. In addition to these, many smaller herds exist, and still more herds of very high-grade females headed by choice pure-bred sires. A splendid field exists in California for the establishment of choice herds of this popular breed, where a ready sale for surplus animals at good prices is assured.

Shorthorns.

Of recent years, the Hereford, now so popular as feeders both in the corn-growing states and upon the western ranges, has been making many friends in California. Up to 1884 this breed was known only to our people through individual specimens, but during that year a large herd was brought to California from New Zealand, shown at the State fair at Sacramento, and sold throughout the State. Since that time these cattle have enjoyed an increasing popularity until within the last few years they have been taken up by many strong breeders and may now be considered as well established here. Six or eight large and very superior herds of the choicest Herefords are now owned in California and the breed is daily obtaining a wider popularity. A strong demand exists for cattle of this breed, and a much greater number could be bred here at a good profit.

Herefords.

This highly meritorious breed is singularly fitted for a considerable use under the conditions which prevail in California, but is unaccountably neglected. The first Devons were brought here in 1860, and since that time have been bred and used by a number of active breeders. Some use is now made of

Devons.

Devon bulls, but few animals of the breed are available and our breeders have generally ceased to look for or use them. But one or two pure-bred herds are owned in the State, and they are little advertised and never exhibited. An active breeder of this useful breed, having good animals, could undoubtedly find a ready sale for his surplus at good prices.

Polled Angus Galloways.

It will occur to the breeders and feeders of the great Middle Western cattle belt as strange that these great breeds are little used in California, but such is the fact. For some reason our range breeders have not regarded them as successful when ranged with large herds of the type of cattle used in California under the conditions which prevail

CATTLE IN CLOVER.

here. In small herds, as feeders and in the hands of the farmer-breeder, they have been most successful, but as such herds have not been numerously maintained heretofore in California, these animals have not been sought for. Under the changed conditions now dawning in the State they will be in demand and the time is now ripe for the establishment here of good herds of these famous breeds.

Guernseys.

This great breed has been strangely neglected in California. In 1881 the first herd was brought to this State direct from the island, but it was not long maintained. Its dispersal, however, carried its blood into many of the practical dairies of the State, and did its part to enrich them. Individual animals have from time to time been brought here, and at the present time a number of choice animals of this breed are being used and bred from in the larger dairy region about Fresno. They are meeting with such favor that the demand for Guernseys is now great, and a breeder

of these popular animals could find no better place to conduct his business than in California.

Jerseys. This great breed has long been popular in California and is the most generally distributed of any of the improved dairy breeds. Fortunately for the Jerseys, they early attracted the attention of a number of California's wealthy men, who spared neither money nor pains to secure the best possible representatives of the breed. The first Jerseys in any number were brought here in 1872, and for some years following they were brought very numerously into the State, shown at the annual fairs, and distributed generally over the State. Most of our dairy herds show some trace of Jersey blood, while we have a large number composed of very high-grade

HOLSTEIN CALVES.

animals headed by registered Jersey sires. In California the Jersey has prospered exceptionally, the mild climate and rich grasses of the State approximating closely to those of the island home of the breed. The breed is in good hands in California, and it is destined to reach a high development here. Two Jersey societies are organized, and the breed is represented by a very large number of small but choice herds. But few large breeding herds exist in the hands of aggressive promoters, but the wide distribution of the breed and their adaptability to California conditions insure their maintaining their position.

Holsteins. In Holstein cattle California is most prominent. Several of our most wealthy men early made favorites of this great dairy breed, and their keen though friendly rivalry gave a great stimulus to heavy importation. A few Holsteins were shown here in 1874 but not until about 1883 were they generally introduced. About

that time many large herds were established here, most of which have since been disbursed and widely distributed. This breed is now liberally used in all parts of the State and is giving general satisfaction. They are used with particular success where alfalfa grows in abundance and upon the rich bottom lands, resembling those of Holland, lying along California's great river system. Several small herds of this great breed now exist here, while three large herds have been collected and established, of a character which will compare favorably with the best herds of this breed in the Eastern States. One of these herds particularly is said to be easily the best in the United States, and to contain more choice animals and high-testing cows than any in this country. With the general introduction of irrigation and increase in population this breed will achieve a still wider popularity.

Red Polls and Brown Swiss.

A few Red Polls have been brought to California and have met with popular favor. Wherever they have been used, either in the dairy or on the range, they have given satisfaction; but their use has been so recent and so limited that they have made no impression on the type of California cattle. Even less can be said of the Brown Swiss, of which the writer knows of only one herd in the State.

Future Conditions.

A considerable change is destined to soon take place in the cattle conditions of California. Her mining, grain-growing and fruit-producing industries have been largely developed, and she is now turning her attention to live stock raising and mixed farming. Irrigation is being much more extensively resorted to, and alfalfa much more generally grown. This plant grows in California more perfectly probably than anywhere in the United States. By reason of this incomparable crop, and because the climatic and other physical conditions here are unequaled, we raise cattle as nowhere else, and our people are beginning to so realize. Our large holdings are being broken up into homesteads, our population is rapidly increasing, and the day of the small farmer and farm-breeder is near at hand. When the grade of our cattle is raised by the use of pure-bred sires; when attention is given to care, selection and breeding, we will grow cattle in California which will give us a distinction as unique as that which we have heretofore enjoyed by reason of our products of fruit and gold. Cattle so grown will constitute an outcross for Eastern herds. The climatic and physical conditions are so different here, and with care and attention the type of our animals will be so perfect and their constitutions so sound, that the Eastern breeder, when seeking blood with which to strengthen and improve his herd, will look across the continent to California, instead of as now, across the ocean to the mother countries.

THE FISHES OF CALIFORNIA.

By DAVID STARR JORDAN,
President of Leland Stanford Junior University.

The total number of fishes known to exist in the waters of California is 435. These may be grouped in regard to their distribution, as follows: About 165 species may be referred to as cold-water fauna. These are species that live near the shore, and whose proper home is found north of Point Conception, or in the cold current which sweeps along our coast, and which renders its waters less warm than in corresponding regions on the Asiatic side. About 117 species belong to the semi-tropical fauna. This occurs to the south of Point Conception and beyond the reach of the cold currents of the north. Of course, these two categories are not sharply divided by Point Conception. Many of the northern species are found south of this point in deeper water or among the rocks, some even of the northern species going far down into Mexico. On the other hand, many southern species find their way northward as far as San Francisco.

Of the 165 species that belong to the north of Point Conception we have two very distinct categories; the one comprises the Arctic and sub-Arctic fishes like the halibut, the sturgeon, and the herring, and several varieties of the flounders. With these are a great body of peculiarly California types, which are scarcely or not at all represented in other regions, and which evidently had their origin upon our coast. Among these, and most conspicuous, are the various species of surf fishes, all viviparous, all commonly and wrongly known as perch. Scarcely less abundant are the various species of rock fishes, red, green, and black in color, which go by the general name of rock cod. The presence of these two types, both viviparous, together with the peculiar coast type of salmon, is the most remarkable feature of the fish fauna of California.

The species which belong south of Point Conception are in most cases closely allied to tropical species, and have evidently had their origin in migrations from the south. These are, as a rule, not distinctly Californian, but belong to types which are widely diffused through the warm waters of the tropics. Their relations are with the West Indian forms, rather than with the other fishes of California.

About one hundred species of deep-sea fishes have been obtained by the "Albatross" in the depths of the ocean off the continental slope of California. These creatures are as a rule very soft in body and almost black in color, and many of them covered with luminous spots, or lanterns, by which they can see their way in the darkness. They live in the open sea, at a depth of from two to five miles, and their soft bodies at this depth are rendered firm by the tremendous pressure of the surrounding waters. In their native haunts the light and heat of the sun scarcely penetrate, the darkness is almost absolute, and the temperature of the water is at the point of freezing. The creatures living at these great depths are not, generally speaking, descended from the

shore species of the same region. They constitute groups by themselves, and forms very similar are found in all parts of the ocean, from the poles to the equator.

About forty-five species inhabit the fresh waters of California. These are about equally divided between the great basin of the Sacramento and the San Joaquin and the basin of the Colorado. Besides the species of trout, most of the fresh-water fishes come under the head of suckers and chubs.

Fishes for the Table. Of the whole number of fishes found, 133 of the marine species are properly to be called food fishes, found more or less frequently in the markets, and being more or less fit for table use. The others, on account of small size, ill flavor or tastelessness of flesh, are not used for food, or else are used only when salted and dried by the Chinese, to whose soups and chowders nothing seems to come amiss. About twenty of the fresh-water fishes are also food fishes, but only seven or eight of these have much value as such.

The distribution of fishes, that is, the question of the extent of the area inhabited by any particular kind, depends on a number of different conditions, the most important of these being the temperature of the water. Most fishes are extremely sensitive to any change of heat or cold. Where, as is sometimes the case, the temperature of the water changes abruptly at a given point, the character of the fishes will be found to change equally. A very little cold is often sufficient to benumb and paralyze a fish of the tropics. On the other hand, the fishes of cold regions can not endure any degree of heat to which they are not accustomed; and doubtless the fishes in the depths would be suffocated by the temperature of the surface water, even if their lives were not destroyed by the diminution of pressure.

Another element almost equal in importance is that of depth. The great majority of marine fishes that we know well, or that we recognize as food fishes, are shore species, inhabiting depths of from one to fifteen fathoms. The great variety of oceanic life is found within this range, through which the light and heat of the sun readily penetrate. As we go lower we find that the shore fauna disappear. The greenish-colored shore fishes give place at from fifty to one hundred fathoms to other species, the prevailing color of which is red. The green or gray colors match the colors of the sand and kelp; the red ones harmonize with the red sea mosses among which the red fishes live. In still greater depths, where light and heat disappear, the prevailing hues are violet or black, the color of darkness.

Cannibals of the Sea. Of less importance, but still a determining quality for very many fishes, is the character of the food to be obtained. Each species thrives best where those creatures on which it naturally feeds are most abundant. The herbivorous fishes live among the tide pools, where they can feed upon the small seaweed; the crab-eating fishes live among the rocks, and those which feed upon herring and silver-sides flourish best in the open sea.

As regards their preference in the matter of surroundings, the fishes of the coast may again be divided as follows: Of the pelagic species, about twenty visit the coast of California. These are fishes which swim freely in the open sea, living mostly near the surface, often moving for

hundreds of miles and belonging to no one country more than another. Of species living about the rocks and feeding upon the small animals which abound in the seaweeds there are fifty species, of which thirty belong to the group known as "rock cod." All of these are food fishes, although not of the best quality. One feature concerning them which is not generally known is that all of them are viviparous. Their eggs are laid in immense numbers, but they are hatched in the body of the female, so that the young are born at the length of one fourth to one sixth of an inch, and commonly rolled up in a coil, only the closest observers being able to detect that the egg was hatched before being turned loose in the sea.

Of the kelp fishes there are twenty-five species. These are chiefly confined to the beds of kelp which are characteristic of the California coast, nothing like it existing on the Atlantic. Some of these feed upon seaweeds themselves, more upon the mollusks and crabs which find their home among the marine plants. Like the rock fishes, the kelp fishes are usually taken by the baited hook from the deck of a boat.

There are ten anadromous species; that is, species which ascend the river in the spring or fall for the purpose of spawning in fresh water, but passing the greater part of their lives in the sea. Of the anadromous fishes the most important are the salmon; the largest in size are the sturgeons. But besides these species several little ones, such as the lampreys, have similar habits.

The fisheries of the coast as a whole are relatively little developed. The bay of San Francisco, the bay of Monterey, the bay of San Diego, and a region about Avalon are fully fished—overfished at times; but the great length of the coast remains almost untouched. Captain Collins estimates that on the 2,000 miles of the coast of California, Oregon, and Washington the fisheries are about equal to those of 500 miles on the coast of New England. The value of the product is about the same in the two districts, and may be roughly set down at $15,000,000 per year. Of this amount the salmon fisheries of the Columbia represent between a third and a fourth, and some $4,000,000 belongs to California. This represents from 30,000,000 to 40,000,000 pounds of fishes each year.

The salmon fisheries of the Sacramento are chiefly in the counties of Solano and Contra Costa. For a number of years these fisheries steadily declined. This was due to overfishing and to the destruction of the spawning beds through lumbering and placer mining. Practically, the only spawning beds left in the Sacramento basin are in the river itself about Red Bluff. The United States Fish Commission came to the rescue, and through the hatchery stations at Baird and Battle Creek it has repopulated the river. At present more salmon run in the Sacramento than when the stream flowed through primeval wilderness.

The salmon of the Sacramento is the quinnat or king salmon, the largest and finest of all the salmon tribe. It reaches in four years an average weight of sixteen pounds. When mature, at the age of three or four years, it leaves the sea and runs up the stream to spawn. It leaves the sea in early summer and spawns in the fall in the upper reaches of the rivers. After spawning all die, male and female. After leaving the sea the salmon of this species never feed, although they readily take the trolling hook in Monterey Bay. The salmon has from 4,000 to 5,000 eggs. As naturally spawned, one egg in a hundred or

more hatches and escapes its enemies. The fish hatchery undertakes to hatch ninety-five out of every one hundred and to put them into the river to drift downward to the sea—"tail foremost," in the old salmon fashion—to return again as mature fishes. The salmon are best as taken in or near the sea. From August to October the old ones are practically unfit for food, being lean and poor.

The Real Fish Royal.

Besides the trout and salmon, California has many other game fish. First of these is the great tunny, or leaping tuna, which ranges from 150 pounds to half a ton, and finds its greatest abundance about Avalon. This wonderful bay has many roving fishes, taken with the trolling spoon—the yellow tail, the albacore, and the huge bass called jewfish, with a head as large as a bushel basket. The barracuda and the great flying-fish are among the game fishes about the Santa Barbara islands.

These noble fishes deserve protection from the amateur angler who catches a dozen or a hundred, has them hung up and photographed, himself beside them, then hires the guide to bury them while he goes away to have fun in his own fashion somewhere else.

Of introduced fishes, two, the striped bass and the shad, both planted about 1878 from the Potomac and the Schuylkill, have been of the greatest value to California. The striped bass can be found in the markets at all times, and in flavor they are as good as in their native waters.

Other fishes which have been introduced are the carp, which has proved an unmitigated nuisance; two species of catfish, which while having value, have displaced better native fishes and should have been left at home; the black bass, which thrives well in the ponds; and the green-blue sunfish, introduced into Clear Lake as food for the bass. The most valuable fish yet to be introduced is the Japanese ayu, or samlet, a diminutive salmon about a foot long, as delicate in flesh as a fish can be. It runs in countless numbers in all the clear streams of Japan, Corea, and Formosa, and should have a place in California. The eel should also be introduced into California.

I may note in passing that the markets of San Francisco fall far short of what they ought to be, and many fish are served in a stale condition. Even our best hotels are none too particular, for which reason our Eastern visitors often wrongly infer that our fish are not so good as those to which they are accustomed. The fish are just as good, but in our glorious climate they keep longer without decaying. But in doing this they grow very stale and lose their fine flavor. The difference is not in the fish, but in the care the dealers take of them, and as to this San Francisco will some time grow more exacting.

We Get Alaska's Best.

The fisheries of Alaska are also largely tributary to California, being developed by California capital and the product mostly brought to San Francisco. The red salmon, blueback salmon, or sockeye, in Alaska outranks in value every other species of fish in the world. Its annual product in Alaska is worth $1,000,000 more than the original cost of Alaska to the United States. It exceeds the entire mineral output of Alaska per year by $1,750,000. The greatest red salmon fisheries are about Bristol Bay and Kadiak Island, but the species runs in some thirty different streams from Puget Sound northward to the Yukon.

The codfish is as abundant in the North Pacific as in the North Atlantic, but the limitations of the market have prevented their development, except about the Shumagin Islands and in the sea of Okhotsk. The herring and halibut have also a large and growing importance in Alaska.

Our Chief Food Fishes.

The following is a list of the chief food fishes of California, arranged in systematic order, beginning with those of simplest anatomical structure. They are grouped in classes. A—those of high importance; B, C, D—progressively less:

Soup-fin shark (D), used by Chinese; California ray (D), used by Latin people.

White sturgeon (B), green sturgeon (D).

Quinnat salmon (A), silver salmon (C).

Steelhead trout (A), Tahoe trout (A).

Rainbow trout (A), cut-throat trout (D).

Dolly Varden trout (D), eulachon (C).

Surf smelt (B), small smelt (C).

Shad (introduced, A).

Herring (A).

Sardine (A), anchovy (C), silver anchovy (D), moray (D).

Sucker (D), Squaw fish (D).

Chub (D), carp (introduced, D).

Bullhead (introduced, B), gray catfish (introduced, D).

Needle-fish (D), flying-fish (C).

Pesce rey (blue smelt, A); small pesce rey, miscalled smelt or white bait (C).

Mullet (B), barracuda (A).

Sand lance (D), chub mackerel (C).

Santa Cruz mackerel (D), tuna (A).

Albacore (A), oceanic bomto (D).

California bomto (B), alleterato (D).

Sword fish (C), yellow tail (A).

Horse mackerel (C); poppy fish, miscalled pompano (B).

Mariposa (D), Sacramento perch (C).

Striped bass (introduced, A), jewfish (B), San Diego rock bass (C), banded ronco (D).

Spot-fin croaker (C), queenfish (B).

Kingfish (C), Sea bass (A).

Weakfish (D); California surf fishes or perch, twenty kinds (C, D).

Garibaldi (D), fathead (B).

Senorita (D), headfish (D).

Rock fish, thirty species, called rock cod (A).

Priestfish, Spanish flag, Bocaccio, etc., red, black, green, banded or speckled (A, B).

Skilfish (C), greenling (C).

Blue-spotted greenling, sea trout (B); cultus cod (C).

Blanquillo (C), kelp fish (D).

Pollock (D), tomcod (B).

Hake (C), halibut (A).

Monterey halibut (B); flounders, thirty kinds (B, C).

THE LUMBER INDUSTRY OF CALIFORNIA.

By E. J. HOLT.

Those who have gathered statistics (T. B. Walker of Minnesota, and others) upon the timber supply of the United States agree upon the following (not reassuring) facts:

In the whole country they find about 1,003,000,000,000 feet (board measure—one inch thick and twelve inches square) of visible supply now standing. Of this total about 625,000,000,000 feet (over 61 per cent) is in the three Pacific Slope states, viz., Washington, Oregon, and California. Of these three, Oregon has 225,000,000,000 feet (36 per cent), California and Washington each 200,000,000,000 feet (32 per cent).

The census of 1900 shows that the timber cut of that year was 26,000,000,000 feet, or .026 of the visible standing. Beyond this the supply was further depleted by some 3,000,000,000 feet cut into shingles, railroad ties, piles and other similar round, hewn and split products, and the process of elimination is increasing in an alarming degree. At this rate, were it possible to fit the product to the needs of the market, thirty-five years would see the end of our United States supply.

However, there is a saving clause so far as the California forests are concerned, inasmuch as the greater supply and greater demand is for "common" grades for rough and framing work, for which, when the time comes, steel will be more largely substituted; while California's high-grade finishing woods will supply the needs for a longer period by far than thirty-five years.

California's asset in her timbered lands is, therefore, becoming appreciated not only because of its present value, but more particularly as it is the last and at the same time to be the most valuable forest on earth.

This pertinent fact demonstrates that as the timber tracts of the United States east of the Rocky Mountains are rapidly becoming exhausted, especially so far as refers to woods in quantity and of quality with which to supply the domestic trade with material for interior and exterior finishing, shop work, doors and sash, etc., in fact, for all other purposes than common framing, the market must soon be largely supplied from this coast, and that California will, as time goes on, be called upon more and more for its wood for these and many other purposes.

The particular uses mentioned require "clear" or "select" qualities of wood susceptible of easy working, slight shrinking and swelling, and which will take and hold good a finished surface, and of all Pacific coast woods, the redwood, sugar pine and white pine of California are preeminently adapted to fulfill these requirements.

California woods also offer a source of supply sufficient for the probable needs of the next three generations, inasmuch as redwood trees produce from 40 to 75 per cent of "clear" and sugar pine and white pine from 20 to 30 per cent, as against the 3 to 5 per cent of the woods of the Middle West.

A VIRGIN REDWOOD FOREST.

California produces a variety of commercial woods, the most used being redwood, white pine, sugar pine, fir, spruce, cedar, "bull" pine, cottonwood, laurel, and eucalyptus, and in proportionate quantities about in the order named, redwood being produced in the largest quantity of any, while the four last named cut but little commercial figure.

Redwood (*Sequoia sempervirens*) is indigenous to this State; it covers a tract on the northwestern coast of California beginning at the northern line (there being not over 2,000 acres over the line in Oregon), and occupies a continuous and fog-fed district from the seacoast eastward to the crest of the Coast Range of mountains about 240 miles long (north and south) and from 10 to 20 miles wide.

In this district were originally about 1,200,000 acres of redwood timbered lands, comprising practically the world's total supply of this most magnificent wood, having from sixty to seventy billion feet of superb merchantable timber, besides from 10 to 20 per cent more in volume of by-products—split ties and posts, wood, some fir and tan bark.

Some thirty-four mill plants have since 1860 grown up and grown rich in this district, and they now own one half of the timbered acreage. These mills have removed probably not more than 20 per cent of the original standing, having during the forty-eight years averaged 220,000,000 feet per annum, while the cut from 1903 from this district (comprising the counties of Del Norte, Humboldt, Mendocino, and Sonoma), has been as follows: 1903, 300,000,000; 1904, 325,000,000; 1905, 390,000,000; 1906, 460,000,000; 1907, 440,000,000; 1908 (estimated), 325,000,000. The present mill capacity is about 450,000,000 feet, based on the theoretical ability to run continuously, which, however, is an overestimate of practicable results.

It will be noted that the result of the catastrophe of April 18, 1906, by which San Francisco lost $500,000,000 worth of property, was to largely stimulate the demand for and production of lumber.

San Francisco yards stocks were at that time fairly heavy, but in addition to the largely increased receipts of lumber from mills (both fir and redwood) were soon practically all consumed in the rebuilding operations which began within forty-eight hours after the disaster. Very little stock lumber was consumed by fire; 1907 receipts also were large, as building continued and yards were gradually restocked.

In the fall of 1907, temporary rebuilding being largely done, and the general financial condition of the whole country being that of restriction, trade demands decreased until in the first four months of 1908, 106,000,000 feet of redwood were shipped from the producing territory above dealt with. This would indicate an expected production for 1908 of about 325,000,000 of feet, or about the same as for the year 1904, which was a normal year.

The effect of the 1906 holocaust upon the future demand for this wood probably will be to increase it 10 per cent a year, as the general conditions likely to obtain in California's (which is redwood's best market) progress promise that or a better increase in all lines of trade with which the demand for lumber is generaly commensurate.

The further existing supply of this wood is found only in the three small counties lying next south of San Francisco along the coast. This supply is very limited, the acreage being small and the timber of low

ON THE WAY TO HOLMES' WOODS, EEL RIVER.

grade, while the present rate of production, even though not now supplying the full demand of these counties, will have exhausted the total supply within the next decade.

In the middle eastern part of the State stand in scattered groves the total remaining samples of the *sequoia gigantea*, the monarchs of the world's forests. They, too, are redwood (*sequoia*), but of a very different character, the product being brittle and soft and therefore not only difficult to handle but also mars so easily as to place it at a disadvantage in the markets where it meets the *sempervirens*. The nearby rail markets will consume the product at good paying prices.

A wise government should, however, buy and reserve this melancholy remnant of the most wonderful tree product of the world, not alone for

SAWING REDWOOD LOGS.

the sentimental value, but also for the very practical and absolutely essential purpose of conserving the supply of water for the irrigation of the enormous and wonderfully fertile San Joaquin valley, which with water could support a population of five million souls.

Besides these standing sequoias there are no others on earth except a few stunted trees in Japan. A curious fact and food for speculation is the presence of fossil remains of sequoia in Nevada, indicating, as do other facts, that we are witnessing the dying gasps of the last few hoary giants of an expiring species, probably the grandest flora of creation. Scientific research proves the age of many of these trees to be nine hundred or more years, while it is an accepted probability that some of them were glorifying their Creator long before the beginning of the Christian era.

From the foregoing it will be clear that the redwood of commerce, from the broader standpoint, will all come from the district on the northwest coast of California.

The topography of this district is generally that of a slope westerly from the crest of the Coast Range of mountains, which slope is serrated by lateral ridges separated by streams and rivers fed annually by from 50 to 80 inches of rain. The water shipping point in Del Norte County is an open roadstead; while for the whole of Humboldt County, the great bay of the same name affords a number of landings.

Mendocino County has a rock-bound coast without bays or harbors, and cargoes are loaded over suspended wire chutes or trolleys, the outer end of the trolley wires being anchored in the ocean. The wire crosses the deck of the moored steamer, the slack being taken up to ship's gaff, thus making a tight wire, up and down which a traveling car is sent.

Del Norte and Humboldt have no railroad connections with the markets, and but a very small part of the output of the other counties is now so handled, 95 per cent of the total being handled by water. Railroad connections to these sections are shortly promised.

Logging is mainly done by steam, fixed engines (bull donkeys), operating as much as one and a half miles of steel wire, dragging a train of logs containing from 30,000 to 50,000 feet to either a river bank or more often to a logging railroad, which in turn delivers the logs to the mill. Logs are cut in lengths of from 12 to 20 feet and from 16 inches diameter up to capacity of mill.

Sawing is done mainly with heavy band-saw mills, which have lately displaced most of the old double and triple circulars.

Machinery is necessarily very heavy, as butt logs frequently sink, while the average weight of fresh-sawn lumber is nearly four pounds per board foot. Commercial trees have diameters at the stump ranging from 20 inches to 17 feet, and averaging about four feet in the northern part of the district, and one foot less in the southern part.

Mill companies generally own their lands, at costs varying from 60 cents to $1.50 per thousand feet on the stump up to 1900, and increasing in value to average now probably twice that figure and in exceptional cases to even three times the highest figures named. A mill buying stumpage for immediate cutting would be called upon to pay from $1.50 to $4.50 per thousand feet on the stump, according to availability, amount per acre, quality, etc. Humboldt and Del Norte timbered lands carry from 50,000 to 150,000 feet per acre, averaging about 75,000 feet, while Mendocino County lands carry from 35,000 to 100,000 feet per acre, averaging from 50,000 to 60,000 feet. Quality of product is softest in the northern part of the district, more acid appearing with consequent increasing hardness and weight the farther south the growth.

The figures of average per acre must be elastic, as more skillful milling and logging operations are developed, and as appreciation of the increasing value of this restricted supply is driven home in the minds of those interested, the product per acre is gradually increased.

More careful felling of trees, less wasteful methods of logging, thinner band saws, closer utilization of what formerly went into slab and edging burners, the use of veneers and shorter lengths; all these causes are becoming more effective in the direction of salvage of this magnificent product.

The above general average figures can now probably be safely increased by 10 to 15 per cent with still better results likely to follow.

Markets for redwood are world wide. Its fitness for a great variety of uses is extraordinary. Its fire-resisting qualities are unique, owing to presence of acid and absence of pitch or resin. When green it is difficult to burn it at all, and when dry it is not easy to ignite and is easily extinguished. The Fire Marshal of San Francisco is on record in writing, authorizing its use in the building of "fire walls" above brick buildings. When the Baldwin Hotel (six stories of brick and wood) burned in San Francisco some years ago, two redwood water tanks on top of the only standing brick wall were found to be intact, being hardly charred, and were still water-tight. It endures the action of both weather and soil to a remarkable degree, the writer having in his office a shingle in good condition which was taken from a roof in

A DOOMED FOREST GIANT.

Fort Humboldt after forty-one years of service. Experience proves its efficient life under ground to be twelve years, as against fir, four years, and oak, six years. Its acid also makes it distasteful to insect pests, and effectually prevents their ravages, which are so disastrous to most other woods. Marine pests will attack it ultimately, but only to a limited degree and after a long time. Costs of product delivered in San Francisco average about $13 per thousand feet, while the present selling price averages approximately $18 per thousand feet.

Quoting two authorities: "Such, then, are some of the qualities and many of the uses to which redwood is preëminently adapted; and when its virtues have been properly tested, it has never yet been supplanted by and other wood in the lines for which its peculiar virtues recommend it. The constant increasing demand in countries where introduced speaks volumes in its praise. It is certainly very difficult to find any

constructive wood in the whole realm of building material that for beauty and grandeur of growth, variety of grain, structure or color, or the purposes for which it can be used, will surpass the *sequoia sempervirens.*"

"It is a beautiful lumber, wide and clear. It has a quality distinct as the territory in which it grows. While not a veritable salamander, it is closely related to the salamander tribe. The district bounded by the fire limits of San Francisco is smaller than that of any other city of

NEAR EEL RIVER.

its size in the country; one reason being that the buildings are constructed largely of redwood and will not easily burn. * * * The fact that redwood swells, shrinks or warps but slightly especially adapts it not only for shingles but for tanks, vats and patterns, while its rich color and susceptibility to high polish, especially of the curly grained varieties and high birdseye burls, are bringing it into great demand for cabinet work. * * * The stumps of trees felled half a century ago are mostly as sound to-day as they ever were. Rarely does a redwood stump show signs of decay. * * * Will redwood hold paint? Here

again is culled out one of the many good qualities of this matchless wood. Redwood will hold paint better than any other building wood, a fact that is demonstrated beyond a doubt wherever it is in use; and this, together with its non-warping and non-shrinking qualities, make it peculiarly adapted for siding and outside finishing of buildings."

The foregoing comments regarding the fire-resisting qualities of redwood are in nowise disproved by the fire of April 18, 1906. In that tremendous heat, stone of all kinds, basalt street blocks, and cement sidewalks were, in the most exposed places, practically disintegrated. In many cases the furniture in tall stone and brick buildings were set on fire, through the upper windows, where no flame came within fifty

A REDWOOD BOARD SIXTEEN FEET WIDE.

feet, such was the intense destructive power of the superheated air from the great furnaces near by.

In 1897 a book called the "Home of the Redwood" was published, setting forth by word and picture the wonders and details of the redwood industry. Unfortunately but few copies remain unsold, as Eastern lumbermen have of later years been busily showing their faith by their acts of investigation and investment.

Pine. Sugar pine (*Pinus lambertiana*) and White pine (*Pinus ponderosa*) have their habitat in the high Sierra, near the snow line. These woods grow mixed and are friendly neighbors with the "bull" pine (*Pinus jeffreyi*) and a cedar, which latter two, however, are of scanty supply, coarse growth, and therefore used for rough work locally, not being qualified to meet other woods in common markets.

The lowest altitude in which these woods best thrive is about 3,000

feet, while the highest is about 7,000 feet, the best growth occurring at an elevation of from 4,000 to 4,500 feet. They are evergreen; their needles dropping as new ones grow throughout the year. They thrive best in the red mountain soil, which is a mixture of clay and bedrock, substrata of the mountains being slate and granite.

The average diameter of saw-timber is about 3 feet, though trees down to 14 inches in diameter are cut for sawlogs. The larger specimens attain a diameter of from 8 to 12 feet, with a height of from 180 to 250 feet. The average distance from ground to limbs is 60 feet, though frequently 90-foot bodies are found. These woods also grow mixed with redwood on the coast, but they are of hybrid quality and infrequent.

The natural habitat is like that of redwood, its northern extreme in southern Oregon, but extends southeasterly to the desert section of the southern part of the State, not far south of Yosemite Valley. It also grows to some extent in Nevada and in Arizona; but in these latter districts the growth is sparse, the body short, and the quality of much lower grade than that of California. The best growth is in the tier of counties in the northern central part of the State having a westerly watershed, and is practically continuous southeasterly.

The Southern Pacific Railroad and its easterly branches at Sisson, Chico, Red Bluff, Sacramento, Stockton, and along the east side of the upper part of the San Joaquin Valley, receive and transport the total cut of these woods except such little as is used locally. In many cases private mill-owned roads connect mills with main railroad, and also in many cases box and door factories located at mills prepare the lower grades of the product for their ultimate uses, thus saving both cost in manufacture and in transportation. Logging is done partly by steam and partly with animals, as the logs average much smaller than redwood, but still much larger than the pine of the Middle West.

Costs of production vary, but probably average close to $12.50 per thousand feet on board main-line car, while the selling prices range from $10 for low-grade box material to $50 for No. 1.

The sugar and white pine interests are in a flourishing condition, due to the efforts put forth in the past three years by the principal manufacturers in introducing this lumber throughout the entire Eastern States, between the Rocky Mountains and the Atlantic seaboard, from Wisconsin to the Gulf of Mexico, and it has been demonstrated through the manufacturers of sash and doors and to the general user of white pine throughout this vast territory, that the California product holds equal merit with the old-time popular so-called cork pine of Michigan and the white pine of Michigan, Wisconsin, and Minnesota.

These woods are white, soft, durable, straight-grained, easy to work, slow to absorb dampness, take polish or paint, will and can be milled in match sizes without splitting easily, though splitting clean if forced. They shrink less than most pines, which fact is essential in good flooring timber, but these woods are too soft for this purpose, yet are unsurpassed for finish, ceiling, doors and sash, piano key boards, matches, ship construction, patterns, trays, sinks, kitchen tables, cabinets, shelving, etc. Where reasonable strength, durability, ease in working by either hand or machinery, cleanliness and stability of form and surface are wanted at a reasonable price, these woods have no peer.

The Diamond Match Company has lately acquired large holdings in the counties of Butte, Plumas, and Tehama and has completed a 35-mile

standard railroad to connect its tract with the main railroad at Chico. The company plans a total investment of over $3,000,000, a good part of which is already expended. The Scott & Van Arsdale Lumber Company has a similar plant in full operation in Shasta County, worth $3,000,000 or more. These plants are exceptions, however.

The annual average cut of sugar and white pine during the last ten years has approximated 300,000,000 feet. The 1908 cut, owing to unfavorable financial conditions, will probably be about 250,000,000 feet, though the demand promises to consume this as well as some of the unsold 1907 cut.

It is confidently anticipated, judging from the general trade developments promised, as well as because of special efforts to widen markets, that the 1909 cut will be near 400,000,000 feet. This will probably remain about stationary thereafter, as these woods are now owned by a very few operators, and as the very excellent policy of the National Government in creating forest reserves has made it less easy than formerly for small operators to locate near main transportation. Through these causes distances from trunk rail has become greater. The topography of the timbered country and its approaches is invariably rough, therefore, railroad building through it is enormously expensive. These facts seem to justify the expectation of few added plants and nearly stationary future volume of production.

In conclusion, it seems fit that this article should make a plea for forest preservation, conservation and renewal. Under present laws and competition, the methods of lumbering are wasteful in the extreme, it being a probable fact that approximately only 50 per cent of the actual standing timber is marketed, while the logged-over tracts are burned and totally neglected, to the utter extinction of the forest tree in that locality. Reforestry is unthought of and the young trees are treated as a nuisance.

Wise, strict laws on this subject, patterned after those of Germany or Russia, should be at once conclusively considered by our Government.

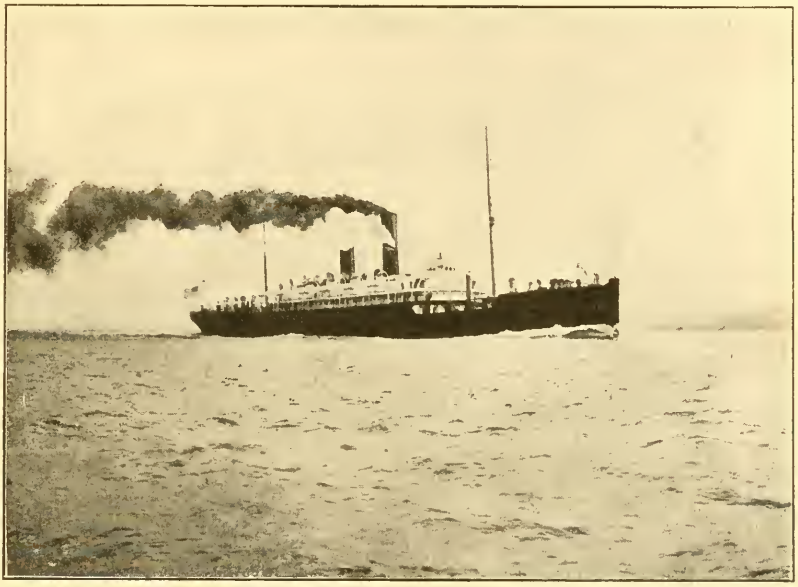
COMMERCIAL.

By HON. GEORGE C. PERKINS,
United States Senator.

Two recent wars have caused the entire world to realize that the Pacific Ocean is now to be the scene of the greatest human activity. The war of the United States with Spain gave us possessions which bring us within speaking distance of Asia, and the war between Japan and Russia showed the former to herself and to the world as one of the most powerful and progressive nations, whose future sphere of action will of necessity lie within the boundaries of the ocean separating America from the Orient.

After the close of these wars the people of each country took up with more zest than ever the work of internal development and commercial

expansion. Japan encouraged industrial growth and the attainment of Asiatic markets, and America turned her attention to the trade with the Far East. More than ever the necessity for a shorter line of communication between the Atlantic and the Pacific was realized, and the result was the acquisition of proprietary rights across the Isthmus of Panama, and the beginning of the construction of a canal. When it joins the Atlantic to the Pacific the course of the world's commerce will be changed. Then the shortest line for sea traffic between the Orient, the eastern shores of the United States and western Europe will run through the isthmus, and then, following the great circle route, will pass close to the Pacific coast of North America until it swings just south of the Alaskan peninsula and Aleutian Islands to



BOUND FOR THE ORIENT.

Japan and China. This, the shortest route to the Orient, will cause the greater part of transpacific commerce to pass within one hundred and fifty-three miles of San Francisco harbor. These few miles in the course of long voyages between ports on the Atlantic and the Oriental countries, are so insignificant by comparison that San Francisco will be made a port of call for nearly all the traffic to and from China. The "City of the Golden Gate" will therefore be drawn into intimate contact with six hundred million Asiatics, with whom trade relations will give rise to a commerce so vast that nobody can estimate its extent and value.

As the commercial possibilities of the countries bordering on the Pacific are developed, more and more will it be realized how fortunate is the situation of the United States. Practically the entire western coast line of North America is ours. Our possessions stretch westward

from the longitude of San Diego fifty-five degrees, inclosing the North Pacific in the great protecting arm of Alaska, which almost touches the shore of Asia.

When we purchased Alaska we hardly knew what we were doing. To the popular mind we had bought a land of tundra, swamp, impassable mountains, perpetual snow and ice and an impossible climate, where civilized man, even if he could keep from starving, could not

ALONG THE WHARVES AT SAN FRANCISCO.

hope to do more. Our money was thought to have been shamefully wasted. But it is a matter of fact that the seals taken from the three small Pribilof Islands have alone returned much more to the government than the purchase price of the whole territory, and a single mine of low grade ore has already produced four times the cost of the entire domain.

The value of the yearly catch of salmon equals the amount paid, while the yearly output of gold has reached a figure nearly double the purchase price. And now copper is rapidly coming to the front as one of the great resources of the territory.

SHIPPING DOCKS, OAKLAND, CALIFORNIA.

Railroads are being constructed throughout the interior, opening up rich mining regions and making available for smelting and other purposes the coal from the rich deposits that have already been discovered. The presence of tin has also been revealed, and prospecting for oil is proceeding, with every indication that it will be found in paying quantities. Perhaps the most important discovery thus far made is coal, for with good and abundant fuel, mining and all allied industries are rendered capable of expansion up to the limit of metallic deposit, and this limit has not yet been even approximately ascertained. Alaska is the great right arm of the Empire of the Pacific, stretching westward and holding in its embrace the northern Pacific Ocean, bringing it

RIVER TRAFFIC.

within the sphere of our direct influence and giving to it a character exclusively American.

That part of this mighty Empire which will, in all probability, always remain the most important, is California. This great State, with nearly a thousand miles of coast line, which in the time of R. H. Dana presented a barren, sandy, fog-laden shore and vast valleys brown with dust and bare as a desert, has in half a century become the garden of the world. The harbors, which were only visited then by hide droghers, have become centers of commerce, and large cities have arisen on what to Dana were the bleakest of shores. Gold brought the Americans, and the Americans brought energy and enterprise, and it was not long till the interior valleys began to export foodstuffs for the world. Already California has driven the prune of France from

the American market; the wines of France, Italy, Germany and Spain; the oranges and lemons of Spain, Sicily and the West Indies; the raisins of Spain and the currants of Greece; the nuts and olive oil of Spain and France; and it is fast displacing the figs of Smyrna.

Whatever can be grown in other parts of the world not exposed to extremes of climate can be grown here. New fruits are even made to order, as it were, by that wizard in plant science, Luther Burbank. The earth is being scoured by experts for the discovery of trees and plants to be added to the constantly increasing varieties grown within the State. Siberia and Italy, India and Brazil, Norway and Africa, are being drawn upon for fruits, grains and plants that may add to the pleasure, comfort and riches of man. And all this wonderful expansion of productive energy is made possible by the science which conserves the moisture of the land, and by the engineering wonders which make the living streams contribute their power to the barren soil.

And this work has only commenced. Already are under discussion plans to completely harness the great Sacramento River and its tributaries, so that no drop of water may escape giving to man its measure of usefulness at the same time that its destructive power shall be forever curbed. The smaller streams which feed the great rivers are being made agents of development, the full extent of which it is impossible to predict. Water power without limit has been going to waste in the mountains, but now every stream is known to be the source of great wealth, and the power which it furnishes is being conveyed by electric wires to all parts of the State, making manufacture possible where before it could not exist, extending and multiplying means of communication, lighting towns and cities, running mines and mills, and doing the thousand and one things for which power is necessary.

California now has within its borders all that is needed for unlimited development, and that that development may well be unlimited one can comprehend when its vast resources are understood. The next half-century will witness an expansion here on all industrial lines that will vastly transcend anything which has gone before; for there will be the additional impulse of the awaking across the Pacific, whose waves of commerce will beat on California's shores with a sound that will incite all its people to utmost effort in the struggle for supremacy. Then will loom large on the Western shore of the continent the Great American Empire of the Pacific.

EDUCATIONAL FACILITIES IN CALIFORNIA.

By ROBERT FURLONG.

Whatever advantages in soil, climate or products a country may possess, the social conditions must also be attractive to make it desirable for family residence.

California has been endowed by nature with a fertile soil, with a climate unsurpassed, and with rich and varied products that are yielded in abundance. Her citizens, emulating nature's example, have in like liberal spirit established those agencies that contribute to man's social enjoyment.

Schools, churches, libraries, fraternal and other civic organizations are general throughout the State. None of these agencies for good society are wholly lacking, and, except in sparsely settled mountain regions, all are accessible to every resident. Nor are these institutions of the primitive type, but are modern and, as a rule, housed in well-apportioned buildings.

Of the several social factors named, none is closer to the hearts of the people than the school. In the country the schoolhouse is the central place of interest, and the school the bond that unites many families into one district community. In the city it is valued as an important agency in the training of youth, and considered necessary for good citizenship.

Few, if any, other states or countries have made such liberal provision for a general system of public education as has California. The founders of the State over fifty years ago inserted in its Constitution a section providing for the education of youth. This soon after led to the enactment of school laws, to the establishment of schools and to the building up of a state school system. California's educational system is a growth, the growth of half a century of careful cultivation. Modeled originally from some of the best systems then in use in older states, it has since been many times modified to meet the needs of a rapidly developing population. In its present advanced form it is recognized by many educators as being the most nearly perfect system of public education in America. Its standards are high, its scope is broad and comprehensive, covering the whole field of school and college education.

To the intending immigrant a knowledge of the educational facilities the State has to offer to its residents is particularly desirable, for it is generally acknowledged that where school facilities are lacking few, if any, parents will care to rear their children, even when other conditions are favorable. On the other hand, a good school near by often determines the location of the future family home. It can here be truthfully stated that there is no community in California without a school. Elementary schools instructing in all the essentials of an English education are general. The law requires the establishment of such schools and provides for their maintenance.

The conditions under which a new school district may be organized are readily complied with where convenience or necessity indicates a change should be made. By this subdivision of a large district a new

community may secure a school where one has not previously been conducted. In this way school districts have been multiplied throughout the State. Many of these have a single-department rural school. When school attendance becomes sufficiently large, several teachers are employed and the pupils are classified into primary and grammar departments. Rural schools of this character are numerous in the fruit sections where the population is dense. Such schools have all the advantages of well-equipped city schools. Town and villages have graded schools of several departments similar to the graded rural schools described.

Every city is a school district of itself and has a board of education and a city superintendent to direct the work. Each city has its own course of study. Because of the large teaching force, close grading can be secured in a city department. This permits of a course of study somewhat more elaborate than that prescribed in the county manual for schools outside city limits. Special supervisors for such studies as drawing, vocal music, manual training and physical education are often employed in city schools to aid the regular class teachers. A teacher in a city department seldom has more than one grade of pupils, whereas a teacher in a rural school usually has several grades.

It does not follow, however, that good work can not be done in a school of mixed grades. Many of the brightest students in the high schools and in the college courses have come from country schools having a single teacher. It should be borne in mind that this district school with one teacher, so common in the rural sections of California, is an important factor in the State's educational system. It is of a much higher class than the rural schools of many of the older states.

The instruction in the California country district is intended to cover the whole field of elementary education. The pupils of such schools are classified and graded the same as are pupils of town and village schools. A county course of study is the same for all schools, except those in cities. Such a course is followed with nearly as much precision in a single-department country school as in any other class.

The legal qualifications of teachers are alike for like grades of certificates, the requirements being the same for country and city. Perhaps in no other State or country must teachers in rural schools hold certificates as high as are held by their fellow workers in the city department. These observations are made here to show that a country residence in California does not to any appreciable extent deprive families of the best school privileges. The State aims to educate all of its children, giving to all like privileges, so far as conditions will permit. To this end, through State and county support, appropriations amounting to nearly nine millions of dollars per year are expended on the public schools. This serves to maintain the schools during eight to ten months in the year. All cities, towns and many country districts have their schools in session ten months each year.

The elementary school described in the foregoing are objects of special favor by the State, as the state school fund is used exclusively in the payment of their teachers. It is in them that the great mass of the children of California receive their early education. As previously

stated, the course is broad and full, including all branches below the high school.

The teachers employed are well qualified for their work, many of them coming to it from professional training schools. But these elementary schools present only one feature of California's educational system. Secondary or high schools form another and a higher class, presenting a different phase of educational activity.

These secondary schools have academic courses that prepare pupils for college entrance. Many of them have additional courses that are elective and do not contemplate later university work. Admission to the secondary schools is to pupils who have finished the elementary course. There are three classes of these schools in the State, known as "city high schools," "county high schools," and "union district high schools." All have much the same plan and purpose, differing only in details of administration and support. Revenue for the maintenance of these high schools comes in part from the State through direct appropriation, but is chiefly levied upon the locality maintaining the school.

Union district high schools are multiplying rapidly throughout the State. They are formed, as the name indicates, by a union of several districts that jointly furnish students and support for one central high school. All taxable property within the area of a union district shares equally in the expense. This class of high school is very popular in the rural sections, as it brings within the reach of country homes a school that gives all necessary preparations for college. There are now few counties in the State that have not one or several schools of this class. They have in general good, substantial buildings, costing variously from fifteen thousand to a hundred thousand dollars each. City high schools are increasing in number also.

The teachers employed in all high schools must have attainments of a high order. Seldom any are legally qualified who have not a college degree from some university of good standing.

There are also a number of private academies, military schools, convents, and other private institutions of learning of recognized merit, in different parts of the State, that fit pupils for college. These, as a rule, charge tuition. Families preferring private education for their children have little difficulty in finding select schools of the kind desired, whether secular or sectarian. Many of the church denominations have colleges and seminaries, as well as schools of lower grades, in which religious instruction is part of the course. There is an extensive system of parochial schools throughout the State, limited mainly to the cities and larger towns.

The higher education is represented in California chiefly by two great universities that are classed among the leading institutions in America. These are the University of California at Berkeley, Alameda County, and the Leland Stanford Junior University at Palo Alto, in Santa Clara County. They are less than fifty miles apart, centrally located and easily reached from all parts of the State.

The first-named is part of the State's public educational system. Maintained at public expense, its doors are open free to all students of either sex who hold proper credentials for admission to its colleges. In the number of its students, the wide range of its college courses and

the general facilities that this institution presents for students' work, "Berkeley" takes high rank among great universities. Branch colleges for vocational study and for scientific research, belonging to the university, are located in different parts of the State. Of these a group of colleges is in San Francisco, in which law, medicine, dentistry, pharmacy, veterinary surgery are pursued as professional studies. Tuition is charged in some of these professional courses. The Lick Observatory, perhaps the best-known astronomical station in the world, is a part of the University of California, on Mount Hamilton, near San Jose. Experiment stations for scientific research are also under the direction of the State institution at Berkeley, but are located elsewhere.

No less known or noted is "Stanford," as is popularly called the most richly endowed university in the world at Palo Alto. Its history and that of its illustrious founders is so well known as not to need review here. It is not due to its liberal endowment, however, that this grand university has become known to the educational world. Its plan and purpose, as designed by its founders, its policy as a university, combined with the strength of faculty, gave it high rank from the beginning, which position it has since successfully maintained.

Both of these grand institutions for the higher education are open, practically without tuition, to the youth of California. No State in the Union can offer better than this—few, if any, as good.

There are a number of other institutions for the higher education, of lesser rank than the two named, that confer degrees. They are colleges of good standing, mostly under the control of some religious sect and, as a rule, supported by tuition fees.

It will be seen that facilities for the higher or college education are not behind those of older states. In some particulars they are better, which fact induces many students to cross the continent for the purpose of study at the California universities.

Besides a State Polytechnic School, located at San Luis Obispo, there are schools of mechanical arts, of mechanical trades and of industrial or manual training.

There are five normal schools conducted by the State for the professional training of teachers. These are so located in different parts of the State that some one of the schools is easily reached by students from any residence section. From these State normal schools chiefly come the great army of teachers employed in the grammar and primary schools of the State. The professional standard is high for teachers in the lowest grade. Superintendents of schools, supervisors, inspectors, boards of education for cities and for counties, together with a State Superintendent of Public Instruction, direct the work of education in the public school system.

Upon the whole, it will be seen from the foregoing that education in California occupies a prominent place, that it is general throughout the State, that it is free to every resident, even in its highest institutions. From the kindergarten through the various elementary and high school grades to the college, inclusive, education is without direct cost to the youth of the State. Families desirious of making homes in California will find here every facility for the education of their children.

MORAL AND RELIGIOUS LIFE IN CALIFORNIA.

By CHARLES R. BROWN,
Pastor of First Congregational Church, Oakland.

In all the years of human history men of moral vision have been going west. Many of them went out not knowing whither they went, sailing under sealed orders and unaware of the full significance of their action, but nevertheless moving forward in the definite fulfillment of a divine purpose.

It was in that spirit of faith that Abraham left Chaldea—he went out, he went west, to Canaan to rear his family in the worship of one God. Thus Paul went out—he too, went west from Troas in Asia to Macedonia in Europe, that he might plant his gospel in the newer continent. Thus the Christian missionaries in the days of Augustine went out—they went west from Italy to England, when the latter country was pagan, that they might evangelize the people. Thus Christian men went west from Europe to become the early settlers in our own land, laying the foundation of the republic in faith and devotion. Thus Whitman and Benton, Junipero Serra and Thomas Starr King went out, going west to make known upon the Pacific coast the message of divine love. And thus the shiploads of missionaries and school teachers still go, moving west, that in the Philippines and all the islands of the sea, as well as in China and Japan, they may sow the seed of a nobler life. It has been a long and unbroken procession, setting out from the older East to the newer West in the spirit of moral adventure.

A splendid share of this idealism went into the early life of California. We find all about us abundant evidence of the venture and heroism of faith. Spanish missionaries, following in the wake of the conquest by Cortes, crossed over to Mexico, and then finding their way up through Lower California, planted their preaching stations in all the valleys that lie along the sea. San Diego and San Gabriel, Santa Barbara and San Luis Obispo, Monterey, San Jose, and San Francisco —these are the enduring monuments of their early efforts; and they went still farther on until they reached Sonoma, where the movement paused. They taught the Indians to think and to work and to pray. They practiced a beautiful, uncalculating hospitality. They gave character to that mission architecture which is a distinctive feature of the State.

And in those early times another world power, Russia, sent hither its missionaries, representing the Greek church. They came, not from the South or from sunny Spain, but from the frozen regions of the North, crossing at Behring's Strait, planting the standards of their faith in Alaska and continuing as far south as Fort Ross, which stands also in Sonoma County. And even as the "Sans" and "Santas" of Southern California testify to the work of the Spanish missionaries from the Latin church; even as the names of "Alhambra" and "Alviso," "Alvarado" and "Alameda," point back still farther to

the time when the Moors crossed into Spain, bringing the Arabic "Al" with them, to be carried in turn by those Spaniards to the New World; so the names yonder in Sonoma County, "Russian River" and "Sebastopol," "St. Helena" and all the rest, speak of the presence of Russian missionaries from the Greek church.

But into the moral life of this mighty State God meant that Saxon ideals and Protestant principles should also enter. Across the plains and around the Horn came a great company of devoted men and women to found schools and build churches which should minister in still other ways to the higher life of this rapidly growing commonwealth. We find, therefore, to-day, as a result of these varied efforts, all the well-known religious bodies well represented in California by able ministers and prosperous churches, which furnish moral leadership to the communities where they stand.

There has been a mistaken impression in certain quarters that moral conditions in California in the days of the pioneers were especially wild and lawless. The country was new, indeed, and the discovery of gold brought adventurers as well as sturdy and useful types of American life. The atmosphere was one to develop that courage and self-reliance which sometimes forget the respect due to order and system. In some of the early settlements and mining camps it was, indeed, as in the days of the Judges: "In those days there was no king in Israel; every man did that which was right in his own eyes." The trip across the plains or the voyage "'Round the Horn" had prompted the spirit of self-reliance until all hands were ready to face difficulty and danger with a jolly good humor which sometimes bordered on recklessness.

But after all the necessary admissions are made, the moral sentiment of the dominant element among the pioneers was just and true. In the days when, owing to the preoccupation of the men of force and influence in rapid money-making, the administration of affairs at San Francisco had become too feeble and corrupt to be endured, there came the Vigilance Committee. It was in its personnel and in its methods of procedure as far removed as could be from the spirit of the mob. They were grave, determined men who saw that necessity was upon them to rebuke defiant wickedness in a way that could not be misunderstood, and to rid the community of a set of scoundrels which were a menace to all decency and honesty. The real leaders of the Vigilance Committee were, indeed, public surgeons, and they cut away with care and insight the cancerous growths which threatened the life of the body politic. The result was that there came a clearing of the air, a strengthening of the moral sanctions and an increase of that better sentiment which is for the health and security of any community.

There are certain characteristics of the moral life of the State which are noticed at once by those who come to make their homes in California. The generosity of the people is warm and abundant. The spirit of those days when men gave freely and even recklessly because they were digging gold out of the foothills by the hatful, has been handed down to their successors. The people now respond readily and largely to the appeals of genuinely good causes.

The evidence of this spirit is apparent in the various sections of the State. The generous thoughtfulness of one family alone on behalf of higher education for the youth of California and of the Greater West

has given more than thirty millions of dollars for the rearing and endowing of Stanford University. When his son died and left him childless, Senator Stanford said, "The children of California shall be my children," and the millions were placed where they would bless and enrich the lives of all the generations of aspiring young men and young women yet to come. In similar spirit James Lick devoted his great fortune to the creation of the Lick School of Applied Arts, of the famous Lick Observatory on Mount Hamilton, where the clear skies of California give astronomers an almost unbroken opportunity for the study of the heavens, and of other well-known institutions which owe their existence to his generosity.

The gift of other fortunes less notable, perhaps, but given in the same spirit of unselfishness, has reared for the people of the State a splendid array of hospitals and homes, galleries and libraries, schools and churches. In all the lines of activity which call for generosity and public spirit there are a great company of citizens here who have learned that "it is more blessed to give than to receive."

The moral life of the State is also characterized by the spirit of freedom and tolerance. The members of religious bodies which observe as their sacred day another day in the week than that observed by the great majority of worshiping people find in California no statutes compelling action which their conscience does not approve and no legal prohibitions interfering with what is to them the pathway of duty. The aim of California has been to "render unto Cæsar those things which are Cæsar's" by legislating only in regard to those secular interests in which all stand alike before the law, and to leave to the free and untrammeled decision of the individual conscience those deeper, personal attitudes and relationships "which are God's."

This absence of the puritanical habit of mind has sometimes been misinterpreted. The strong, natural, adventurous men who always rally on the frontiers are ever impatient of restraint—sometimes impatient of wholesome restraint. The outdoorness of our life; the fact that over wide areas people may, if they choose, go off upon picnics fifty-two Sundays in the year, has added to this spirit of freedom which may indeed be carried to excess. This manifest geniality of the climate and the inviting nature of the outdoor air have therefore had something to do with an irresponsible habit of mind. It is much easier to believe in the wrath of God against evil in Northampton than in Pasadena, especially in the winter months. The absence of some of the rigors and terrors that have found place in the habits of mind belonging to serious people in other regions has not always been to our advantage.

But even as religious people have found upon the whole that a separation of church and state, and the consequent commitment of all religious interests to the care of voluntary loyalty, have been for the advantage of both church and state, promoting a more resolute and less formal type of piety, so the air of freedom and the less conventional atmosphere touching matters of ethics and religion in California have meant the development of a large class of men who, left to themselves, chose righteousness simply because it was right. The children of any republic must in the long run learn to be free without abusing their freedom; and in this large confidence that virtue will in the long run

furnish its own effective sanctions California has sought to build her moral life. "She has shown her faith in the power of noble ideas by simply setting before them an open door."

The religious life of the State is characterized as well by its missionary zeal. The churches which are here are the results of missionary gifts and enterprise on the part of others in the early history of the land, and the heirs of this gracious legacy are resolved to hand on the inheritance, not diminished, but increased. The readiness of the various congregations to respond to appeals for contributions to advance religious work in the lumber camps and mining towns, in the lonely villages and the sparsely settled regions, is proverbial. The mountains and the arid regions which cut us off from immediate contact with the rest of the country but serve to strengthen the feeling of fellowship and brotherhood among Californians; and the interest of the cities in the country, of the older communities in the newer, promotes this warm and sympathetic missionary interest which aids steadily in the furtherance of righteousness.

The situation of California, fronting on the Pacific and looking across toward great populations yet to be inspired by higher ideals than those furnished by their own ruder faiths, acts also as a stimulus to foreign missionary enterprise. The prevailing sentiment is that the whole Pacific coast has come to a sublime period in its history. The oldest homes of civilization were inland. In the valleys of the Euphrates and of the Nile the children of men built their early cities, planting their homes along the great rivers. But as the strength and the ambition of the race were enlarged the seats of civilization were transferred to the greater body of water, when Tyre and Corinth, Rome and Constantinople, became the nerve centers of the world's enlarging life around the Mediterranean. But civilization grew apace until it removed to the borders of the still greater Atlantic—London and Liverpool, Hamburg and New York, became centers of influence and power. But to-day, as never before, the interest of the world is upon and around that greatest of all the oceans, and wise men in the political and commercial councils of the world are saying that the Pacific will be the future theater of the world's most important events. It becomes, therefore, of vital importance that our nation should face that ocean with the spiritual frontage of a robust, intelligent and devoted religious life. This obligation is deeply felt, and it is being met in a generous expression of missionary interest on the part of all the religious bodies in California.

The presence of such a large proportion of men in all the churches is remarked by those who visit California. David Starr Jordan of Stanford University has called California "one of earth's male hands," accepting Browning's designation of certain regions which call peremptorily for the masculine virtues. "The first Saxon settlers," he says, "were men, and in their rude civilization women had no part. For years women in California were objects of curiosity or of chivalry, disturbing rather than cementing influences in society. Even yet California is essentially a man's state. What we commonly call public opinion—the cut-and-dried decision on social and civic questions—is made up in the home. It is essentially feminine in its origin, the opinion of the home circle as to how men should behave. In California

there is little of this convention and tradition, for, speaking broadly, in California the virtues of life spring from within and are not prescribed from without. In short, California is a man's land, with male standards of action—a land where one must give and take, stand or fall, as a man."

The very predominance of the masculine element in the life of this younger of the states in the Republic has done much to emphasize the responsibility of the man in matters of religion. There is among us a smaller percentage of men who hold their religion in their wives' names. The mother of Zebedee's children is less often compelled to go alone to offer petitions and prayers on behalf of her sons while Zebedee is away fishing. The presence of this large number of men in the various congregations of the state tends to make the preaching direct and practical; it aids in keeping religion free from unwholesome mysticism or empty sentiment.

The presence of a larger percentage of criminals than is found in some of the older states is sometimes cited to California's disadvantage. If we had only the criminals of our own raising we would be ready to stand comparison with the best states of the Union. But, as all students of sociology know, the criminals, the tramps, the ne'er-do-wells of other states are constantly fleeing to the West to escape detection or in the hope of finding an easier field for exploitation. They move on until they reach the Pacific Ocean, and then, unable either to cross it or to effect a return to the abandoned fields in the East, they heap up like drifting sand and dirt upon our borders. The accumulation, therefore, of those who have gone West, not to grow up with the country, but to escape disaster which they had brought upon themselves in other states, accounts in large degree for the greater proportion of the criminal element on the western border of our country.

It would not be of general interest to give here tabulated statistics touching the value of church property in California, the number of communicants, the wide range of benevolent activity to be found in all the religious bodies. If space permitted the introduction of such figures, California would make a splendid showing. The growing appreciation on the part of the people as a whole touching the wholesome moral influence exerted and the humane service rendered by the churches is indicated by the fact that four years ago the people, by a handsome majority, adopted an amendment to the constitution exempting from taxation all church property used exclusively for religious worship, thus bringing California into line with the other states of the Union. The influence of this action is seen already in the erection of more permanent, costly and beautiful structures as places of worship in all the cities of the State.

It might seem invidious to name any and not name all the religious organizations at work in California, but certain facts seem especially worthy of notice. Some of the largest and best appointed schools and convents, hospitals and homes of the Roman Catholic Church in America are to be found in California, for, from the days of the Spanish grants to the early missionaries of that faith, this church has enjoyed great prosperity. The fourth largest Congregational Church in the United States is located in Oakland, California, and one of the largest Presby-

terian churches in the country is in Los Angeles. The maintenance of their historic forms of worship in the well-appointed synagogues of all the larger cities and the kindly service of their well-organized and far-reaching charities, testify alike to the prosperity of the many Hebrew congregations. The noble traditions of the Episcopal Church, the glowing zeal of the Methodists, the missionary earnestness of the Baptists, the robust faith of the Lutherans, the evangelistic activity of the Christians, as well as the characteristic notes of religious life in the many other bodies at work within the State, all find expression in the flourishing societies which bear these various names and labor together in loyal harmony for the triumph of righteousness and peace in a land beautiful in climate and situation, and growing daily more beautiful in its deeper, inner life.

The splendid showing made by the religious forces of this commonwealth is the more remarkable when one reflects upon the fact that California is essentially a new country. We need only turn back fifty years to find a situation just beginning to be touched by those forces which make for the permanent prosperity and well-being of any state. If one should stand with uncovered head at Plymouth Rock in the old commonwealth of Massachusetts, or reverently tread the soil of Jamestown, Virginia, the story of California's briefer life would seem like a watch in the night or as yesterday when it is past. The paint and the varnish are scarcely dry on much of the work which contributes to the welfare of the people.

Yet religion is naturally a plant of slow growth; it is one of the conservative forces of society and does not leap into its full strength in a night as do some of its rival influences. Its gentler virtues do not thrive in the bustling atmosphere of a gold excitement or a real estate boom. It accomplishes its work best where it quietly becomes incorporated in the institutions and habits, in the sentiments and affections of a people, and thus comes to its own appointed fruitage in a nobler, purer and more humane life. All this requires time; and religion has not yet come fully into its own here in California, because of the brief period covered by the history of the State.

The Lord of all the values there are began a long time ago, even before the building of Solomon's Temple, in order that He might have the great sequoias of the Sierra ready for our coming. In the far distant past He sowed the seeds of those splendid forests which adorn the hillsides in Mariposa and Calaveras. In similar fashion, the many people now intent upon the higher life of California are to-day sowing in fidelity and love the seeds of that mature, well-developed and effective Christian civilization which in spirit and moral quality shall match the glorious climate and the wonderful resources of this fair State. And this noble result shall not be alone for our security and well-being—it will be for the healing of the nations. The gateway of the West is a "Golden Gate"—through it comes in the commerce from the Orient that shall make the nation rich, and out of it shall go those wholesome influences which, as missionaries of the Lord, are to enrich the lands beyond the sea with values that perish not.

OUTDOOR LIFE OF CALIFORNIA.

By WILLIAM GREER HARRISON.

We live in our lungs; therefore, anything that improves our abode is of importance. The question naturally arises, "What is the best method of increasing lung power?" The answer is, "Deep breathing of pure air." In other words, the continuous exercise of the lungs in inhaling clean air and exhaling impure air. Exercise in the open is the way of enlarging the breathing capacity of the lungs.

Throughout California the conditions of climate are such that lung exercise may be indulged in at all times without risk to any organ. The temperature of the lungs is never oppressive; no blizzards, no cutting winds, no stabbing of the lungs by frozen air: a genial, balmy, yet exhilarating atmosphere everywhere. San Francisco has a mean temperature of 65 degrees. The temperature throughout the State makes a mean of about 60 degrees. In the interior the air is so dry that at a summer temperature of 100 degrees, outdoor sports, tramps and mountain climbing are as freely indulged in as in the autumn. In midwinter, outdoor amusements, such as long-distance tramps, shooting, fishing, and swimming, are enthusiastically pursued. For years it has been the custom for the writer to lead a large number of Olympic Club members, on Christmas and New Year's days, over a fifteen-mile tramp right into the Pacific Ocean, where the party breasts the breakers, plays leapfrog on the shore, and gambols and scampers like lads of ten, and not a man catching cold. All over California there is in the air an electrical stimulant which is most bracing and which does away with that tired feeling so common elsewhere.

Then we have the pines, the aroma from which is almost an intoxicant and is the most subtle and effective of lung tonics.

We have the redwoods; giants, grand, stately towers in the forest. The exhalation from these acts upon the lungs as a light massage and emollient.

We have rivers and mountains, lakes and valleys, not exceeded in natural beauty anywhere.

We have pine-clad and brush-clad hills to clamber through, which is a joy without limit. The pleasure in hill-climbing is increased always by the beauty of the landscape, the rivers or the ocean, with islands, points, promontories and straits which fill the eye everywhere and yield a sense of enjoyment found only in the use of the eye and the muscles.

California is a land of brown shadows and blue skies—the brown of the hillside, the blue of the ocean and its reflection in the sky, produce unpainted pictures in lavish abundance. Wild flowers—unwritten poems—greet you everywhere. Waterfalls, the joy tears of the mountain sprites; cascades, in whose music you hear the weeping of wood nymphs over dead forest kings. The bubbling, babbling brooks, interpreting the song of their silver-coated citizens; the cooing of the dove, the whir of the quail, the whiz of the snipe, the honking of the wild

goose, and the frou-frou of the duck—all these are for the man who loves nature and desires to be at home with her, and are common everywhere in California.

Here the sportsman finds his paradise, and here are—

Birds: Mountain and valley quail, English jacksnipe, wild pigeon, blue grouse, sage hen, robin (big, full-bodied birds), meadow lark, curlew, black ibis, billhead plover, vacet, willet (snipe), king rail, Virginian rail, reed bird, robin snipe, sandpiper.

Ducks: Widgeon, teal, sprig, gadwell, canvasback, redhead, butterball, ruddy, blue-bill, Mexican tree duck, brownhead or whistler, mallard, spoonbill.

Big game: Brown or cinnamon bear, black bear, elk, mule deer, blacktail deer, silver-gray fox, red fox, California lion (puma).

Small game: Gray squirrel, pine squirrel; rabbit—cottontail, brush and hare; beaver and ground-hog.

Fish: Salmon—landlocked, quinnat, blue back, hookbill; trout—rainbow, cut-throat, red speckled, brook, Loch Levin, Von Behr; rock cod—blue and red; flounders, tomcod, smelt, halibut, barracuda, striped bass; perch—redtail, surf and big-eye; sole, white bait, pompano (butterfish), sturgeon, shad, anchovies, sardines.

Fish, birds, big game and small game can be reached easily by short-rail routes; and then comes the true pleasure of the sport—the climbing, clambering, tramping; the oxidation of the lungs and muscles; the joy, the pure physical joy, of movement; the luxury that follows the overcoming of difficulties; the scramble over big rocks; the climb over hills carpeted with pine needles, and the enthralling sense of victory when the objective point is reached.

Alone in the woods—alone with God! Alone on the mountain top, you are reverent and prayerful, but never sad or depressed. Breathing in the pure mountain air, you breathe in hope, inspiration, and you would commune with the Master of the World, and rejoice that you live and move and find harmony in your heart. You can throw your cap peakward and shout like the schoolboy out for his holiday; for you have drawn away from and mounted high above the pettiness of the lesser life. You have shuffled off the business coil which bound you to your desk; you are free, and the thought of freedom is yours; and you are buoyant and gleeful and in love with all the world.

California is the home of the artist; indeed, California is another Italy, and a new Virgil would write the Bucolics and Georgics as of and about the Italia of the Pacific. Virgilian description of the old Italy exactly fits the newer and richer state. But we have color effects here not known, I think, even in Italy. Take the hills overlooking San Francisco—Marin hills—and you have a bronze-brown effect in color that is tantalizingly beautiful, because you want to catch and hold it as a something too exquisite to be left to itself. You have an infinite variety of shadings to this weird brown; indeed, there is a kaleidoscopic change, from second to second, which is literally fascinating.

Then our sunsets; in them there is a supreme beauty, since all colors, all shades—dazzling, rioting, perplexing—mingle with or are a part of the rays which glorify the sky, the hills, the valleys, the seas, the ocean, with a light that is as the smile of the Eternal. Here is the

place in which to *breathe* the sunshine. Light and colors are inhaled, and it is time some one explained the beneficent effect of the inhalation on the blood and brain and moral nature of man. California is the solarium of the world. When the sun throws aside the robes of night and breathes his morning benediction, until his evening prayer, when his lingering blessing touches everything with his kiss, there is a golden dusk or a sun-charged atmosphere in which man may drink a newer, richer draught of life.

And the ocean, the Pacific; never monotonously peaceful; just a vast champagne bath, a universal salt glow, where massage is free to all the world. Always open, never a bar to ingress; no ice, no snow; a storm only momentary and joyous excitement. The roar of the breakers

A NEW YEAR'S SURF-BATHING PARTY IN PACIFIC OCEAN, NEAR CLIFF HOUSE, SAN FRANCISCO.

an organ peal, the swell a flowing song, the spume an electric bath. Summer or winter, never a day when you can not safely enter the Pacific, plunging and swimming, breasting breakers or high waves, with a feeling of victorious pleasure and a sense of fitness that is a promise of eternal youth.

From San Francisco to San Diego and thence to Catalina Island there are bays, inlets, roadsteads, where foaming steeds, white horses of the sea, rush madly to the shore. Here the strong swimmer finds joy inexpressible. Dashing under the swirling breakers he floats triumphantly for a moment in the long hollows of the ocean, and then with an increasing vigor again and again evades the rush of waters and with practiced arms steers his way to the sea incarnadine that lies like another sky beyond the breakers. Here, summer or winter, he

WINTER SCENE—ON THE BEACH AT SANTA MONICA.

flings aside the resisting waters and heads oceanward—a long, steady pressure, an overhead stroke or a side stroke carries him far from view, until presently he turns shoreward with rapid strokes when he once more margins the breakers. These he uses like a circus rider, and mounts horse after horse until he is once more on the shore lines. The strength of it, the joy of it, only the swimmer can feel.

And all this in winter as safely as in summer. Indeed, it is absurd to talk of winter in the Golden State. All days are open to the athlete and his pleasures.

If you tire of the old ocean, then turn your eyes lakeward. Tahoe sits in the Sierra like a great golden-gray bowl, full of limpid water teeming with silver-coated trout; guarded by mountain ranges so weird

A CHRISTMAS SWIMMING PARTY AT ALAMEDA.

in form and in color that one naturally looks for the gnomes, elfs, goblins, which have, or ought to have, their homes in the curious crevices, caverns, brakes, peaks, domes, curves, and bends which make of Mount Tallac and his kin a giant's causeway leading to a land of delight. Tahoe is 6,000 feet above the sea level; Mount Tallac is 3,000 odd feet above the lake, and from its rugged peak you look down upon a score of lakes set like precious gems in a setting of emerald green. The tramp to Tallac's gray top is just rough enough to give an added interest; it is a stiff climb, but when the peak is under your feet you forget everything except the glory and the joy of the vista.

You tire of the lake scenery? Then off to the McCloud River for trout, or to Monterey Bay for salmon trolling, or the Sacramento for perch and salmon. Oh, I could name you hundreds of places in which to be glad that God made you!

Once a year, usually in the month of August, members of the Bohemian Club of San Francisco shake the city dust from their feet and for three weeks make their home in the heart of a redwood forest. " 'Neath the green sentinels, whose feathery plumes sweep the patines of Heaven," they pitch their tents and abandon themselves to a life that is in harmony with Nature. The fisherman fishes and the pedestrian makes his ten or fifteen miles daily, whilst others lie prone on the bosom of Mother Earth, breathing in the forest air with a sense of pure enjoyment. The singer and the story-teller weave fancies that find expression in music and literature and painting. Others group themselves in nooks and hollows and wonder what the giant trees could tell if only Nature enabled them to reveal their knowledge. These trees were above ground long before the Babylonian empire fell. They were lofty pillars of the forest when Joseph went down into Egypt, and they were probably full grown when Christ was taken by another Joseph to the land of Pharaohs. Europe was the home of barbarous tribes when these felt their full growth; and civilization after civilization appeared, fulfilled its destiny and was succeeded by new thoughts, new purposes, these to make room for the dominant purpose of to-day. Yet these trees lived and breathed ere England or America had a name or a place upon the map of the world.

California is the only country in the world, I think, where midsummer is entirely free of rain and where it would be possible to spend three or four weeks absolutely in the open.

Polo, football, baseball and tennis are playable all the year through; and golf, lacrosse and cricket are only temporarily retarded by the degree of wet in the soil after our annual shower bath. Thousands of our young lads and lasses pay no attention to rain, but pursue their walks in wet weather as in dry. Indeed, few outdoor pursuits are affected by our wet season. We have usually three or four days' rain, followed by a fortnight of the most delightful weather—clear, bright, sunful days when one rejoices in life.

In the bay counties we have sea fogs, which are of infinite service to all growing things, and are to many a source of pleasure in their effect upon the skin.

But the great charm of California is that always and everywhere you can live in the open, except in the brief interval when rain is most abundant.

Fullness of days, rather than length, is the desideratum. A weak man is a travesty on Nature. Better fifty years of strenuous, full life than one hundred years of vegetable existence. But in California long life and full days go together. In the free, open life of the Golden State there is no excuse for lack of health; only the inherently indolent suffer. All who accept the treasures of the air, the sea, the forest, and the ocean as their own put on the full garb of man and woman and live such a full life as can be lived only in California.

The joy of living; the rapid-coursing, life-making blood; the clean, full lungs; the buoyancy of youth in middle-aged man—these are ours, and we thank God for life!

OLYMPIANS HAVE NO FEAR OF CHILLS.

[From the San Francisco Chronicle, December 30, 1908.]

The continued cold weather has not placed any clamp on the rapidly increasing list of names of Olympians who intend taking a dip in the surf at the ocean beach on New Year's morning. Up to yesterday afternoon over two hundred members of the winged O organization had signified their intention of being at the starting point on the first day of the year, and, judging from the interest in the outing, the affair will surpass all previous tramps held under the auspices of the Olympic Club.

At nine o'clock the start will be made from the club house on Post street, from which point the party will be conveyed in special cars of the United Railroads to the entrance of the Park at Fell and Baker streets. The start from the latter place will be made at ten o'clock, a comfortable pace to be maintained so that the older members of the club as well as the more strenuously inclined will be able to reach the end of the trip at the same time. Shower baths have been provided for those who may not desire to brave the waters of the ocean, and breakfast in the open will be the all-important event after the bath. George H. James, who has charge of this event, states that all those who desire a change of clothes after the walk can have the same conveyed to the beach by leaving them at the club any time to-morrow. The return home will be made at the convenience of the members, although the cars will be at the disposal of the club at an appointed time.

CALIFORNIA'S RESORTS.

By W. N. WRIGHT.

California is well known for its famous resorts, yet few strangers have any idea of the variety of health and pleasure resorts that are situated in her sunny valleys and beautiful mountains. The fame of California's magnificent hotels, fine beaches and equable climate has spread throughout the United States, but few know of the many charming little resorts nestling in shady nooks in the foothills or under the green roof of her forests, beside swiftly flowing trout streams. There are hot springs gushing water of the same chemical constituents and curative qualities that have made Carlsbad famous, and wild mountain canyons that rival the beauty and grandeur of the Alps.

They are not advertised broadcast as are the larger resorts, and it is generally necessary that you come to California before you discover them. Once you are here take up any guide to California and you can find hundreds of them scattered from one end of the State to the other, ideally situated, and all enjoying the same equable and rejuvenating climate.

Mineral Springs—California possesses mineral springs which have proven of great value in relieving many ills. Most of these are in the

foothills, where the air is exceptionally dry and tonic. They consist of the usual sulphur, iron, saline, and alkaline springs, and the water of some of them is of very high temperature.

El Paso de Robles Hot Springs, at Paso Robles, on the Coast line of the Southern Pacific, are perhaps the most famous hot springs in the State. Analysis shows the chemical elements of the springs to be in about the same proportion as those of the most famous hot springs of Europe and America. They are sulphurous and alkaline, and vary in temperature from 60 degrees to 122 degrees Fahrenheit, and have proven of great merit in the treatment of rheumatic, blood, glandular,

PASO ROBLES HOT SPRINGS, CALIFORNIA.

and cutaneous affections; in kidney and bladder irritations; in catarrhal and other troubles of the mucous membranes; in anemia, malarial poisoning, and the nervous disorders requiring the tonic effect of water treatment.

But Paso Robles is by no means a place for invalids exclusively. It is just as popular for recreation seekers, for tourists, travelers and business men seeking rest, and tired people getting back their nerve force.

The combination of the hot springs, hotel, and bath-house; the climate and the pleasing surrounding country make this institution one of the most complete and popular of its kind in any country.

Near Paso Robles Hot Springs are the Santa Ysabel Hot Springs, the waters of which have been shown to be very similar to the famous Arkansas Springs at Little Rock.

Seven miles from San Luis Obispo, also on the Coast line, are the San Luis Obispo Hot Springs. They are situated in a beautiful valley, only one mile from the ocean beach. The temperature of the water is 110 degrees Fahrenheit and its volume 200,000 gallons every twenty-four hours.

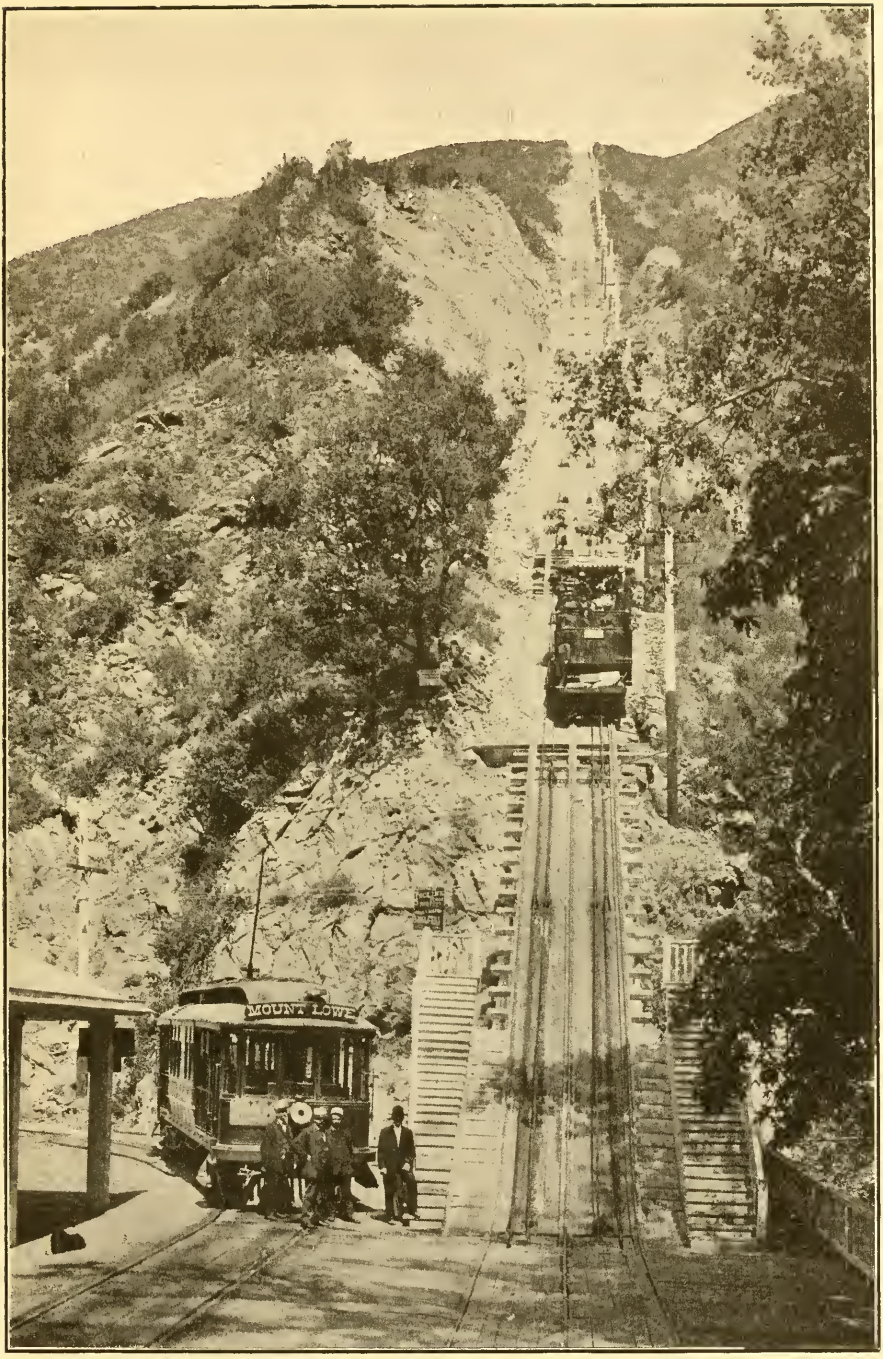
The Santa Barbara and Montecito Hot Springs in the Santa Ynez Mountains, a short distance from Santa Barbara, resemble the Hot Springs in Arkansas. As the water is sulphuric and antacid it is a great help for those afflicted with acid conditions of the blood and urine, or troubled with Bright's disease.

THE BEACH, SANTA CRUZ, CALIFORNIA.

The Matilija Hot Springs is Ventura County's chief outing resort. They are situated in a pleasant mountain canyon six miles from Nordhoff on a branch of the Southern Pacific. On the banks of a good trout stream is a charming hotel, while grouped around it are many small cottages and tents for campers. A large swimming tank is one of the prominent features of the Springs.

Carlsbad, just north of San Diego, is named after the famous springs of Germany. The Temecula Hot Springs are also located in San Diego County, and are well-known in the southern part of the State.

Arrowhead Hot Springs, situated in San Bernardino County in the Sierra Madre Range at an elevation of nearly 2,000 feet, are the hottest curative springs in the world. The temperature of the water is 196 degrees Fahrenheit, and its flow is half a million gallons per day.



MOUNT LOWE RAILROAD.

There are thirty-four different springs which vary widely in the degree of their chemical constituents. The hotel is a magnificent building, and the bath-house is equipped with baths for every form of modern hydrotherapy. The mud baths are a feature of Arrowhead, and upon them its fame in the past has been largely built. The waters are best adapted for relief from rheumatism, gout, dyspepsia, early stages of heart disease, incipient Bright's disease and disturbances of the bladder. Paralysis and paresis, together with locomotor ataxia, are often given relief.

Paraiso Springs, one hour's ride from Soledad, on the Coast line of the Southern Pacific, has excellent arsenic, soda and sulphur springs.

HOTEL POTTER FROM THE PLAZA, SANTA BARBARA, CALIFORNIA.

Gilroy Hot Springs, in the Santa Clara Mountains, thirteen miles east of Gilroy, are among the best known in the State. The water is used for rheumatic affections, skin eruptions, and blood disorders.

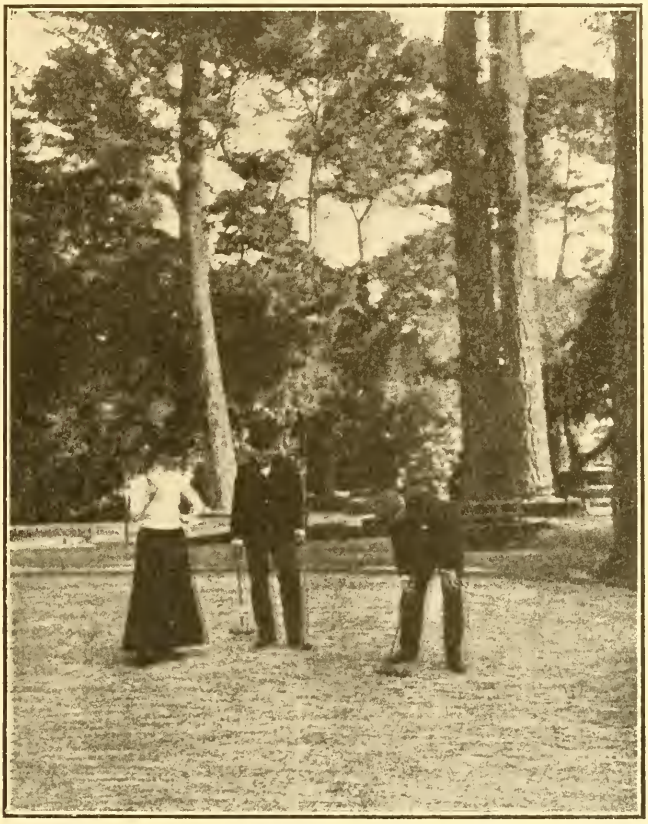
Byron Hot Springs, in Contra Costa County, two hours' ride from San Francisco, is a favorite resort. There are several springs, and the water is used internally or as baths for various ills. The hotel is spacious, and the grounds exceedingly attractive.

Sonoma County, north of San Francisco, has a wealth of mineral springs that are very popular, among which are Agua Caliente, Mark West Springs, Skaggs Hot Springs, and the Geysers.

Shasta Soda Springs, situated in the picturesque canyon of the Upper Sacramento River, on the Shasta route of the Southern Pacific, is an attractive mountain resort. It is here that the famous Shasta water is bottled.

Ætna Springs, in Napa County, is a delightful resort. There is no large hotel, cottage like being one of its peculiar charms. There are mineral water baths and a large swimming tank, while radiating in every direction are excellent roads for walking, driving, riding or automobiling. Ætna mineral water possesses marked aperient properties, and is almost a specific for dyspepsia and kindred disorders. Large quantities of Ætna water are bottled at the springs and shipped to all parts of the world.

The High Sierra of California, extending from Mount Shasta in the



CALIFORNIA—A WINTER PLAYGROUND.

north to Mount Whitney in the south, is without doubt the most beautiful and interesting mountain range in the United States. Four hundred and fifty miles of snow-capped peaks, vast canyons, wild gorges, rushing rivers and forested slope—truly it is a rememberance dear to the hearts of those who have followed its trails and explored this wonderful country where the deeds of man fade into insignificance before the marvelous wonders Nature has accomplished. Pack trips can be made to Kings River Canyon; the Grand Canyons of the Kern and Tuolumne rivers; the Giant Forest, where grow the largest and tallest

trees in the world, and to Mount Whitney, the highest mountain in the United States (14,898 feet).

The new Yosemite Valley Railroad goes within twelve miles of the famous Yosemite Valley, with its gigantic peaks and five big waterfalls. Daily stages meet the trains, and there are excellent accommodations in the valley in the way of hotels and camps.

Lake Tahoe, a beautiful mountain lake twenty-three miles long by thirteen miles wide, and 6,240 feet above the sea level, is fifteen miles by railway from Truckee, on the Ogden route of the Southern Pacific. Walled in by high peaks, it is one of the most picturesque spots of the Sierras. Around its pine covered shores have been built many fine hotels and summer residences.

Within an hour's ride from Los Angeles are a number of fine beaches where surf bathing may be enjoyed every day in the year. In addition to the fine hotels which these beaches support, there are many small cottages to be had for those who desire to remain any length of time.

Venice, with its lagoons and gondolas, arching bridges over winding canals, restaurants in ancient galleons, hotels of Venetian architecture, great auditorium and music, is a remarkable copy of the Venice of the Old World. Here under a sky as blue as that of the Adriatic one can easily imagine he has been transported to the home of the Doges.

From Venice there extends along the beach a broad promenade to Ocean Park, one mile away. The latter place possesses an attractive pavilion that is equipped with every device known in the amusement world for driving dull care away. Other well-known beaches are Santa Monica, Long Beach, and Huntington.

A delightful ocean trip of two hours takes one to Catalina Island, the home of the leaping tuna, the hardest fighting fish in the world. There is an excellent beach, and the island is a favorite resort.

One hundred miles up the coast from Los Angeles is Santa Barbara, a world renowned coast resort, which claims to have the most perfect climate in the world. It is the winter home of many wealthy Easterners, and boating, bathing, tennis, golf and other outdoor sports can be enjoyed every day in the year.

Further north is Santa Cruz, with a new Casino, electric pier, plunge baths and unexcelled beach, and only a short distance from a fine grove of the big trees. Nearby is Del Monte, in some ways the best known resort in America. Capitola and Pacific Grove in the same vicinity also have excellent beaches.

Although San Francisco can not be classed as a resort city, nevertheless there are many places of interest and sights worth seeing in and about the city, or across the bay in the cities of Oakland, Berkeley and Alameda, and down the peninsula towards Stanford University and San Jose.

The bay cities have a cool, invigorating climate which is preferred by many to the more tropical climate of the southern part of the State. The temperature varies so little, however, that semi-tropical flowers grow in profusion and the same outdoor life may be enjoyed. In fact, the whole State is one bright garden of nature, molded into sunny valleys, green hills and snow-covered peaks, with an equable and tonic climate, and possessing mineral springs to cure the ill, and sufficient other attractions to make it a Mecca for pilgrims after health and happiness.

TRAVELING IN CALIFORNIA.

By W. N. WRIGHT.

Traveling in California no longer means trying experiences with stage coach and poor hotels. In their place have appeared luxurious trains, speeding over fertile valleys, through wild and picturesque canyons, by snow-covered mountains, and stopping at famous resorts where the hotels approach as nearly as possible the tourist's ideal. Every convenience known to twentieth century travelers will be found on the trains of the three great railroads which enter California from the East—the Southern Pacific, Santa Fe, and San Pedro, Los Angeles and Salt Lake.

In addition to these, there are thirty-three smaller railroads which extend through different parts of the State, and a trip on some of them has unique and interesting features.

Although California has only two per cent of the population of the United States, it already has three per cent of the country's railroad mileage. California is the second largest State in the Union. It is larger than the combined areas of New York, New Jersey, Vermont, Maine, New Hampshire, Connecticut, Ohio, and Massachusetts, and there are but two counties in the State that are not tapped by some portion of the 7,300 miles of steam railroads that the State contains. The advent of the Western Pacific during the current year will add materially to the mileage of the State, and open a new route to the East. The electralization of roads has received much attention recently, and California now has over 1,700 miles of electric railroads, with many more miles projected.

The Southern Pacific operates 3,742 miles in the State, and enters by three different routes. The Sunset Route from New Orleans carries one through the Great Southwest by way of El Paso, Texas, Tucson and Yuma, Arizona, to the wonderful fruit and flower garden around Los Angeles. The Ogden Route crosses the famous Lucin Cut-off over Great Salt Lake, climbs the high Sierra, and gives the tourist many glimpses of beautiful mountain lakes and snow-clad ranges. On this route is Truckee, where change is made to visit majestic Lake Tahoe. The Shasta Route comes in from the north by way of Portland, Oregon, crosses the Siskiyou Mountains, passes Mount Shasta, winds down the wooded canyons of the Sacramento River, and at the head of the Sacramento Valley branches into two lines, one going west and the other east of the river through rich agricultural sections, and both joining the Ogden Route at Davis and Roseville, respectively.

At Benicia all trains that come over the Ogden and Shasta routes are ferried across the Straits of Carquinez on the "Solano," the largest ferryboat in the world, having four double tracks, and capable of carrying two large passenger trains at once. At Oakland all passengers for San Francisco coming by either the Shasta or Ogden routes are ferried across the bay of San Francisco. The Dumbarton Cut-off, which is

being constructed across the lower end of the bay, will do away with the ferry, and all trains will run direct to San Francisco.

The Shasta Route with its continuation, "The Coast Line," from San Francisco to Los Angeles, has been fittingly styled "The Road of a Thousand Wonders," and is one of the most interesting and beautiful scenic roads of the world. The Coast line leaves San Francisco by the new Bay Shore Cut-off and runs down the coast, following closely the line of famous old missions built by the padres who came from Spain and Mexico in the eighteenth century. From Oakland a line runs down the east side of the bay to San Jose, and thence to Santa Cruz. At San Jose connection is made with the Coast line.

Along the Coast line and its branches are found many of California's

FERRYBOAT SOLANO—LARGEST IN THE WORLD.

show places and famous resorts, such as Stanford University, the old Missions, Hotel Del Monte, San Jose, Santa Cruz, Paso Robles Hot Springs Hotel, San Luis Obispo, and Santa Barbara. For many miles the track runs along the high bluffs that face the ocean, following closely the contour of the coast, and presenting a magnificent view of the broad expanse of the blue Pacific and the great breakers dashing on the rocks far below.

From San Francisco the Southern Pacific has two lines which run down the fertile San Joaquin Valley, through Fresno, Bakersfield, and over the famous Tehachapi loop in the Tehachapi Mountains to Los Angeles. Branch lines extend to all the important towns and districts of the valley. The Yosemite Valley Railroad, which now goes to the

very gateway of the valley and the Big Trees, connects with the Southern Pacific and the Santa Fe at Merced. This is a very interesting trip of seventy-eight miles through the winding canyon of the Merced River.

The Santa Fe enters the San Joaquin Valley from the south over the same track as the Southern Pacific, but branches off at Bakersfield and runs through the valley on two different tracks of its own, terminating at Point Richmond and Oakland. Passengers for San Francisco are transported across the bay on large ferryboats.

The San Pedro, Los Angeles & Salt Lake Railway enters California from Salt Lake City, Utah, by a southern gateway, passing through the great orange belt, and using both the tracks of the Southern Pacific and the Santa Fe in reaching Los Angeles.

NEW MOTOR CAR INSTALLED BY SOUTHERN PACIFIC ON BRANCH LINES.

San Francisco being the principal city and port of California, all the railroad lines converge at this point, and it is easy to reach any part of the State from here. In addition to the lines already mentioned, several other railroads have San Francisco for a terminus. The Northwestern Pacific runs northerly from San Francisco through the beautiful hills and wooded canyons of Marin and Sonoma counties, where are situated some of California's most famous mineral springs and resorts.

The Mount Tamalpais Scenic Railway, noted as "the crookedest railway in the world," is just across the bay from San Francisco, and connects with the Northwestern Pacific at Mill Valley. This is one of the most interesting pieces of railroad construction in existence. In a series of great loops the train climbs to an elevation of 2,300 feet, overlooking

the city and bay of San Francisco, and affording a magnificent view of the Pacific Ocean. Similar to the Mount Tamalpais trip is the ride up Mount Lowe from Los Angeles. This mountain is ascended by electric railway and inclined cable to an elevation of 5,000 feet, giving an extensive view of Los Angeles and surrounding territory.

The railways in the southern part of the State converge towards Los Angeles. The Sunset Route of the Southern Pacific, the Santa Fe, and the San Pedro, Los Angeles & Salt Lake all enter California by way of Los Angeles. Leaving Los Angeles in the morning, a trip can be made on the "Inside Track Flyer" of the Southern Pacific through the orange and flower belt, visiting the cities of Ontario, Covina, Pomona, San Bernardino, Riverside, and Redlands, returning to Los Angeles the same

AN OVERLAND TRAIN.

day, and giving a very comprehensive idea of the charms of Southern California.

The "kite-shaped track" of the Santa Fe takes one also through the heart of the orange belt and back to Los Angeles the same day. From Los Angeles the Santa Fe extends south along the coast to San Diego.

Los Angeles is the center of a network of electric lines, which extend throughout the surrounding country, and it boasts of the finest electric suburban system in the world. Every few minutes fast electric trains leave a central station for the beaches and other points of interest. The Northern Electric is an important electric line which runs through the principal cities of the Sacramento Valley. It is constantly extending its lines, and will undoubtedly be of greater importance in the future. The San Jose & Los Gatos Interurban through the Santa Clara Valley affords excellent service through a rich farming section.

A unique feature of traveling in California is the system of gasoline motor cars inaugurated by the Southern Pacific. These cars are used for local traffic between important towns. They run on the tracks of the regular trains, and have proved entirely satisfactory for quick transportation between local points.

In the north of California there are but few railroads, and most of them are owned by big lumber companies. The Nevada, California & Oregon Railroad in the northern part of the State is perhaps the most

ELECTRIC RAILWAY TO THE TOP OF MOUNT LOWE.

important line besides those already mentioned. It enters California at Purdy, in Plumas County, and runs a hundred and sixty-four miles to Alturas, the county seat of Modoc County.

From Weed, California, on the Shasta Route, the Southern Pacific is building a line through Butte Valley to Klamath Falls, Oregon, which is for the most part already completed. This line is to be extended to Crater Lake, Oregon, and will join the Shasta Route again in Oregon, opening up a rich agricultural territory, as well as adding some great scenic attractions.

In addition to the building of this road, the Southern Pacific is constructing from Mojave on the Sunset Route, a line running northeast to

Owens Lake to connect with the Nevada & California Railway, which enters California in Mono County and runs down to Keeler in Owens Valley.

Travel in California is not confined to land, however. The Sacramento and San Joaquin rivers, the great inland waterways of California, are navigable for many miles, and all sorts of craft loaded with grain, vegetables and fruit reach San Francisco from the interior valleys which they drain. At San Francisco one can board steamers that ply up and down the coast, going as far north as Cape Nome in Alaska, and south along the coast of South America. On the bay of San Francisco one can see ships carrying the flags of all nations, and the big liners of the Pacific Mail, the Oceanic, and the Occidental & Oriental steamship companies leave regularly for Hawaii, Japan, China, and the Philippines, while other ships go south to Australia, New Zealand, Tahiti, and other islands in the South Seas.

Thus, whether on land or sea, California offers to the traveler the best of everything in the way of traveling conveniences. As for variety of attractions and beautiful scenic routes, together with an enjoyable climate, there is no State in our broad country that surpasses it.

THE THIRTY-FIRST STATE.

By RUFUS P. JENNINGS.
Chairman of the California Promotion Committee.

History records instances innumerable of the tremendous effect accidental happenings have had on the trend of events. California owes much to chance. Chance it was which revealed to the startled eyes of James W. Marshall the golden glint in the stream of the Sierras, and more quickly than the "shot heard 'round the world" aroused the nations did the echo of the cry of "Gold" reverberate with increasing volume through the fastnesses of the Rockies, past the vast fields of the Middle West, beyond the centers of commerce of the East, and over the seas to foreign lands. All the world knows the response that was made to that cry, for the discovery of gold brought to California in an incredibly short time a people distinguished for their cosmopolitanism.

January 24, 1848, the day on which California became the El Dorado in truth, is an epochal date in the development of the United States; it marks a turning point in the history of Pacific commerce. It was the natal day on which the seed was planted which sixty years later was to blossom forth, resplendent in its fruition, in the United Pacific States, the alliance for the common good of all of the seven western commonwealths. Measuring what is to come by what has gone before, on the centennial day, January 24, 1948, the Pacific front will loom formidably large in the nation's activities—a factor whose potency conservatism declines to even suggest.

California! To the United States it has been the "Open sesame" of the Arabian Nights. How inane seems the attempt to describe it.

DATE PALMS—NAPA COUNTY.

Only to grasp wholly the majestic spirit that pervades and is infused through California's atmosphere were an accomplishment worthy of the most gifted pen. Let not the pessimist approach the theme, for it will destroy his self-satisfactory doctrines and force him to ally himself to the opposite school of philosophy. Even more so, let not the too sanguine optimist start to draw the picture, for the very force of his enthusiasm will confound him by the immensity of the scope which the subject will give him. Resort must be made to the rigid reasonings of the impassive logician and to the unadorned recital of facts.

Chance gave the first impetus to California's development, but it was due to something more that the thirty-first star was added to Old Glory on the ninth of September, 1850, when California assumed its place in the sovereignty of States. Nature exerted a beneficent influence, for it gave to California a climate which as long as poesy endures, will be a fountain of inspiration for him who would sing in enchanting verse. It gave to California a soil in which all the products of the temperate and semi-tropic—and some of the tropic—zones may find a habitat that will insure good crops. It gave to California a mineral wealth which has every year been pouring into the nation's coffers in an uninterrupted stream many millions. It gave to California fertile valleys to be the homes of a prosperous people and destined to support many times the present population. It gave to California great rivers which carry to market the products of the interior and which make fertile the soil of the valley farms. It gave to California harbors unsurpassed, gateways of the Occident, in which the world's commerce may be accommodated. And, in the last analysis, Nature gave to California, the California of romance, a scenic wonderland that, in its grandeur of mountain, of valley, and of seashore; in its snow-bedecked peaks and massive cliffs; in its wooded glades and bounding streams—in all its primeval realm is beyond compare. Out of the beaten paths to the rallying-points of nature lovers lie many yet-to-be-discovered retreats, known only to the more zealous seekers of sequestered corners where the master strokes that were wrought when California's topography was fashioned still retain every semblance of primeval grandeur. Truly California adds much weight to the slogan that has gone forth: "See Europe if you will, but see America first."

Since the beginning of the new century California has moved forward at an accelerating ratio. Features of its development have been the cutting up of the big ranchos and estates into small holdings; the extension of diversified and intensive farming; the construction of irrigation systems; the development of electric power through the utilization of the energy of mountain streams; the extension of electric railways into the interior; the drainage and reclamation of swamp lands; the construction of modern highways and good roads; the development of oil fields; and the increased activity in mining. In the increase of manufacturing, the inexhaustible supply of raw materials, cheap fuel, and power, continually improving transportation facilities, and the proximity of ready markets have been noteworthy factors. Tracing the record of the growth of agriculture and horticulture during the past decade, the public economist finds the basis for the expansion that has been made.

California, in extending a beckoning hand to those of less favored regions imbued with something of the wanderlust, has always pointed to

its public school system as one of the fundamental bulwarks of its strength. It is reported that California has a larger percentage of population attending high schools and universities than any other State. Every county has adequate school facilities; notably, the school system of the rural districts has been well developed, the people always responding liberally to the call for support for the schools. Where the population is small the high school courses have been concentrated in union schools. Technical schools, business colleges, and private educational institutions are numerous and many have attained a reputation not confined to their immediate neighborhood. To train teachers for their profession the State has established five normal schools at—from north to south—Chico, San Francisco, San Jose, Los Angeles, and San Diego. At the forefront of the educational system of the State stand the two great universities, the University of California, a State institution, and the Leland Stanford Junior University. The former has affiliated technical branches scattered all over the State. Recently the University Farm was established in Yolo County, and there short courses in various phases of practical agriculture are given for the benefit of farmers or students.

Free public libraries are to be found even in many of the small towns of California, and under the fostering guidance and encouragement of the California State Library new libraries are constantly being established and improvements and extensions made in others.

As in other connections the prevalence of a broad and enlightened spirit is a marked characteristic of the religious life of Californians, and churches for every denomination and every creed exert their wholesome influences in the community life.

Deservedly has California attained the distinction of being the best advertised State in the Union. The State's products—wheat and barley, oranges and lemons, grapes and prunes, nuts and apples, beans and corn, gold and oil, butter and cheese, lumber and manufactures (a complete list would be a long one)—have brought the name of California into the home, in America and abroad, for years. Greater than the fame which has come through those things which go to market to swell the nation's commerce is the renown that California has won in every land through its climate. Not only has it become the winter rallying-point for people of means, but a spreading knowledge of California conditions is making it an all-the-year-round rendezvous for tourists. Along its twelve hundred miles of ocean-fronting coast, or in its valleys and mountains, recreation and relaxation and refreshed vigor are sought and secured in full measure. The mineral springs alone would bring thousands to California were there no other attractions. With an appreciating realization of the wealth of these endowments, California has done much and is now doing much more to provide for the accommodation, comfort, and pleasure of the visitor of, to use a happily coined word, touridient, he who comes to see and admire, but, ultimately, stays to live and enjoy.

Perhaps no stronger point could be made in California's favor than that those who set out on journeys to the outside, be it for business or pleasure, on a first trip or one of many, to the east or to the south, or to the north or over the seas, come back to the native haven better Californians, better in the fuller knowledge and deeper appreciation of all that is good about California.

SAN FRANCISCO—THE REBUILT METROPOLIS.

By NORMAN F. D'EVELYN.

In the history of the to-morrow when the deeds of the to-day may be measured in their true aspect through the adjusting perspective of time, the story of the building of the greater San Francisco will be cited to show of what stuff were made the men and women of twentieth century America. The new San Francisco stands to-day an imposing monument to the courage, the resourcefulness and the perseverance of the American people. What has been done bodes well for the future progress and development not only of the city and the State, but of the Nation, for it demonstrates the potency and capacity of the sturdy stock of the land we live in. Weavers of the inspiring tale have asserted that the rehabilitation of San Francisco—keeping in mind the magnitude of the work and the obstacles that had to be overcome—surpasses in rapidity and substantiality any similar achievement in ancient or modern times. Something beyond individual consideration has stimulated the people of San Francisco to restore their homes and businesses on a better basis than before; for when the crisis came the spirit of civic pride was intensified many fold in the universal determination that a grander city should rise on the peninsula of the Golden Gate—finer in every respect than the old.

Obviously, the stranger has been in a better position to judge of "things as they are" than has the resident. His viewpoint has given him a broader survey of the situation; his judgment has been less liable to diversion by phases of occurrences that have been merely side issues, because he has stood aloof, an impartial observer. Through newspaper interviews and articles sent to home papers, visitors have expressed themselves in decided fashion, and the pith of their statements has been that San Francisco has performed splendidly a herculean task. They have marveled at the magnitude of the situation that had to be faced, saying that it exceeded in reality even the most highly-colored accounts they had read; and they have been astonished at what has been done in less than three years.

Some idea of the point of view of the outsider has been gained by the resident who has had occasion to leave the city, and on returning has been startled by the decided progress made during his absence, even if it was of but a month or two's duration. On every hand he has seen some evidence of work done; here a cleaned lot where once it was covered with twisted masses of iron and steel; at another point symmetrical steel uprights and girders where his last observations had noted only a yawningly empty space; or perhaps he found on his return the granite or stone facing in place on some massive structure, covering the sturdy columns which he had seen put in place when he had passed by as he was leaving for his trip. It may be that he traversed a smoothly bituminized thoroughfare where before a broken-up street hampered traffic. Perchance his attention was attracted to a busy scene in the interior of

REBUILT SAN FRANCISCO—FAIRMOUNT HOTEL.

REBUILT SAN FRANCISCO—CALIFORNIA STREET, THE FINANCIAL CENTER.

REBUILT SAN FRANCISCO—MARKET STREET, FROM EDDY AND FIFTH, LOOKING EASTWARD.

a bank or department store on sites which he remembered were in an uncompleted state. Again and again demonstration has been afforded of the amazement of returning business men who during their temporary absence even followed the trend of affairs at home through the press reports. It is not extraordinary that those who have been actors in the center of the stage of the unprecedented drama have been too intensely wrapped up in the concerns of the day to give thought to the full breadth of it all, and that their impression-dulling familiarity took little heed of each advance.

Lest the pen should seem to the reader unfamiliar with the situation in San Francisco to trespass beyond the limits of credulity, resort is made to matter-of-fact, incontrovertible figures.

In place of the 28,188 buildings, valued at $105,000,000—figures compiled by a committee appointed for the purpose after a careful examination of the books of the assessor—covering the 508 blocks in the affected district, there stand to-day new structures of the character outlined in the following table of building permits granted from April 18, 1906, to January 31, 1909, (the records are for the entire city, no segregation having been made, but of course by far the larger number of permits, and those for the big structures, were for building in the down-town area):

Class.	Number.	Value.
A	77	$18,649,982
B	108	7,949,831
C	1,309	40,297,635
Frame	11,804	48,618,113
Alterations	5,929	9,234,769
Total	19,227	$124,750,330
Adding 15 per cent for undervaluation		$143,462,879

Substracting the number and value of the permits for alterations and repairs (though in reality "alterations" often meant virtually new buildings, so extensive was the rehabilitation and remodeling necessary) and adding the customary fifteen per cent to cover added cost after the issuance of permits, a percentage regarded as entirely conservative, it is found that 13,298 new buildings have been built or are in process or contemplation of building, valued at $132,842,895 (including the added fifteen per cent). This gives an average value of $9,989 per building, while the average value of the 28,188 buildings previously occupying the district was but $3,732, thus showing a gain in valuation of the new structures of 167 per cent. Some months ago, on investigation, it was found that the floor space in the new buildings was greater than that of the aggregate floor-space area in the old. If we carry out the average valuation of the new buildings for 28,188 buildings, it is found that the aggregate value would reach $281,569,932, though it is to be borne in mind that the new buildings in many cases occupy larger ground areas than the old and that it would take less than that number of buildings to cover the district.

Estimates of population indicate substantial growth. At the beginning of 1906 San Francisco had a population of half a million. An estimate made shortly after April 18th of that year placed the population at 175,000. In November, 1907, when the first directory of the new city was issued, it was computed that the population was 479,635.

REBUILT SAN FRANCISCO—ST. FRANCIS HOTEL.

Just a year later a careful estimate showed a population of 507,301, a gain in a year of 5.7 per cent. Further, it is estimated that from 640,000 at the beginning of 1906, the population of the San Francisco bay cities has grown to 807,000, an increase of 167,000 in three years, while there is now within fifteen miles of the city hall of San Francisco an aggregate population of 900,000.

Turning to bank clearings of San Francisco, always regarded as a register of general business conditions, the following yearly totals tell their own story:

1900	$1,029,582,594 78
1905	1,834,549,788 51
1906	1,998,400,779 06
1907	2,133,882,625 80
1908	1,757,151,850 08

Since 1896 there has been an uninterrupted increase year by year in the annual clearances, with the exception of 1908, and apropos it is hardly necessary to explain that the cause of the falling off in that year was the financial stringency which affected the entire country, and from which California and the rest of the Union has recovered. It is of interest to note that from one source that keeps in close touch with financial conditions comes a prediction that the clearings for 1909 will exceed $2,400,000,000. In seven years between 1900 and 1907 the clearings more than doubled.

If it were desired to supplement the indications of the clearances and substantiate the obvious growth and progress which these figures show, reference might be made to the records of the annual receipts of the San Francisco post office, which tell an equally eloquent story:

1900	$1,052,286 00
1905	1,772,867 60
1906	1,509,595 91
1907	1,787,694 03
1908	2,011,090 16

The receipts, it will be observed, practically doubled in eight years' time. The 1908 figures showed a gain of 12½ per cent over the receipts of the year before, particularly impressive in view of the abnormal conditions that depressed business in 1908.

That the statements made to the effect that San Francisco, despite the fact that it was in process of building, was probably less affected than any other city by the crisis which depressed commercial America at the close of 1907 were based on something more than general observation is indicated in the following statistics gleaned from the San Francisco Real Estate Circular:

	Real Estate Sales.		Mortgages.		Releases.
Year.	No.	Value.	No.	Value.	No.
1905	9572	$74,926,065	6746	$35,016,855	4751
1906	8947	68,064,300	5488	35,825,680	4660
1907	8204	31,816,150	6401	44,583,753	4134
1908	7418	31,083,571	6257	41,841,729	4541

The value of the releases is not obtainable. It is notable that while the mortgage records of 1908 were less than those of 1907, there was a greater number of releases in the former year. Attention should also be called to the fact that while the value of the real estate sales was

REBUILT SAN FRANCISCO—THE NEW PALACE HOTEL.

approximately as large in 1908 as in the preceding year, the number of sales was considerably smaller, showing that relatively bigger transactions were made in 1908 than in 1907.

Bearing in mind that an abnormal quantity of structural materials were brought into San Francisco after reconstruction began, it is not surprising to find that the commerce of the port for the last fiscal year was not up to that of the preceding twelvemonth. For the year ending June 30, 1908, the harbor receipts, as shown in the biennial report of the Board of State Harbor Commissioners, were $1,101,949.67; for the preceding fiscal year the total receipts were $1,241,284.96. Customs receipts totaled $6,816,398.40 during the year ending December 28, 1908, against $8,124,715.38 for the previous year. Plans have been matured for comprehensive improvements and additions to the harbor facilities which will anticipate the tremendous increase in the commerce which will inevitably follow the completion of the Panama Canal, which is centering attention on the Pacific as the theater of the world's commercial activities during the twentieth century.

No better indication has been given of the solidity of San Francisco's position than the overwhelming vote last May in favor of bonds for $18,200,000 for public improvements, including an auxiliary water supply system for fire protection, sewer system, garbage disposal system, and schoolhouses and public buildings. When $3,280,000 of these bonds were offered for sale in September, 101 bids were received, aggregating over seventy million dollars, and the issue was disposed of for $3,514,520, a premium of seven per cent. The successful bidders disposed of the bonds "over night," so great was the demand. Two thirds of them were purchased with California money, and in this connection it is timely to say that only several millions of outside money has helped in the reconstruction of the city, the bulk of the capital having been local. Including the portion of the last issue that has been sold, the entire debt of the city and county is $6,729,100; within the charter limit the municipality has a borrowing capacity of nearly fifty million. The assessed valuation of the city in 1908 was $454,332,820, jumping from $429,632,843, or more than five per cent, in a year. Twice that percentage of increase was registered in the municipal revenue, $9,834,531 in 1908 and $8,914,304 in 1907.

After the authorization of the bond issue the improvements provided for were begun and work has been pushed forward vigorously since. In addition to the bond election in May, another was held in the following November, and by a six to one vote the citizens of San Francisco provided for the issuance of $600,000 bonds for the purchase of water rights and other preliminary steps to secure a water supply from the Sierras.

To-day San Francisco stands serenely confident of the fulfillment of the destiny which her brave people, even in the days of crisis, regarded as inevitably assured. Here on the Pacific is the most modern, most sanitary, and withal the most unique and individual and cosmospolitan city in the United States. Never was San Francisco more attractive to visitors, for hotel accommodations are more ample and more sumptuous, with a wider range of prices, than ever before. Within the city and across the picturesque bay of San Francisco are the many points of interest which week by week lure the city dweller to the number of

REBUILT SAN FRANCISCO—MARKET STREET, LOOKING EASTWARD FROM EDDY.

thousands away from things metropolitan, and on every hand is to be found evidence of that spirit which has made Californian hospitality distinctive to all who have sojourned within its borders.

The focus for the vast wealth of the yet undeveloped back country, the distributing center for the products of the Orient, the metropolis of the Western Americas, the Occidental gateway of the United States, San Francisco triumphant has begun its new era.

PAST AND PRESENT OF THE FRANCISCAN MISSIONS OF CALIFORNIA.

By Hon. J. R. KNOWLAND,
Member of Congress, President of California Historic Landmarks League.

Within recent years there has been a very perceptible awakening of interest in the Franciscan missions, a subject which forms a unique and fascinating chapter of California's picturesque and romantic history. As a result, organizations have been formed in both Northern and Southern California with the object in view of preserving and restoring the remaining missions—landmarks around which cluster a flood of historic memories of the pastoral days of long ago.

But two links are missing in that chain of missions, twenty-one in number, which stretched from San Diego in the far south to Sonoma in the north. San Rafael Arcangel and Santa Cruz missions have entirely disappeared, not an adobe brick or tile remaining to designate the former locations of these one-time flourishing establishments. Of the remaining nineteen, Soledad mission, in Monterey county, is a hopeless ruin, the rains of each succeeding winter gradually leveling the few desolate adobe walls, pathetic reminders of pristine glory.

After practically a century of neglect, during which time the hand of vandalism was not stayed, Californians are fortunate, now that public sentiment is aroused, that more of these ancient piles are not shapeless, crumbling masses beyond human power to restore. To-day eighteen of the California missions are in a condition to be preserved for posterity, but in a number of instances the chapels have entirely disappeared, other buildings, however, which formed a part of the respective establishments, having withstood the ravages of time.

The Order of Franciscans, when they importuned Carlos III. for the necessary authority to plant the cross in Alta California, were actuated by naught but pure and unselfish motives. When at last Spain granted the permission so long coveted, the dispelling of the darkness of paganism was by no means the controlling influence which prompted the action of the Spanish court. The importance of extending its dominion over the north had long been realized. The existence of the desirable ports of San Diego and Monterey was known. Had these California ports been occupied they would have been found most serviceable to the Manila galleons, richly laden and often sadly in need of repairs and

fresh provisions, which sailed from the west by the northern route. Pirates would sometimes temporarily occupy these ports while lying in wait for the Spanish galleons.

The fear of Russian encroachments also exerted an influence in arousing the Spanish authorities to the necessity of occupying California—a fear which was well grounded, as events later proved, for in 1812 the Russian government established a fort known as Ross, within the present county of Sonoma. Remains of Fort Ross still exist.

Military as well as spiritual was to be the first civilized occupation of California. Both presidios and missions were to be established. At San Diego in 1769 the first mission was founded by the president of the Franciscans, Father Junipero Serra. Land and sea expeditions—two

SANTA BARBARA MISSION.

of each—had been fitted out in Baja (Lower) California, and it was upon the arrival of the last of these several detachments that the cross was planted and the spiritual conquest of Upper California begun.

In 1774 San Diego de Alcala mission was moved six miles from the original site, the location of the present ruins. R. H. Dana, Jr., in his "Two Years Before the Mast," tells of a visit he paid to the mission in 1834: "After a pleasant ride of a couple of miles we saw the white walls of the mission. There was something decidedly striking in its appearance: a number of irregular buildings, connected with one another and disposed in the form of a hollow square, with a church at one end rising above the rest, and with an immense iron cross at the top." Continuing his description of the buildings as they appeared after they had been practically deserted, Dana adds: "Just outside of the buildings, and under the walls, stood twenty or thirty small huts, built

of straw and branches of trees. Entering a gateway we drove into the open square, in which the stillness of death reigned. On one side was the church; on another a range of high buildings with grated windows; a third was a range of smaller buildings, and the fourth seemed to be little more than a high connecting wall."

The padres of San Diego mission were the pioneers of irrigation. A few miles above the mission are the ruins of a dam built fully one hundred and thirty years ago to supply the mission with water. This dam was thirteen feet in thickness and covered with cement that became as hard as stone.

Only a portion of the chapel of San Diego mission remains. The Landmarks Club of Southern California has expended $500 in safeguarding the few walls of this, the mother mission.

San Carlos Borromeo (Carmelo) mission was the second to be founded. The first land expedition under the leadership of Portala was unsuccessful in locating Monterey, continuing north and discovering San Francisco Bay. This expedition returned to San Diego. Undaunted by failure, a second expedition, composed of a land and sea detachment, was later fitted out. Both divisions arrived but eight days apart, and upon the shores of placid Monterey Bay the royal colors were unfurled, the cross planted, and under the spreading branches of a great oak, mass was said by Father Serra on the 3d of June, 1770. A year later a more suitable site was chosen near the bay and river Carmelo. The mission is now known both as San Carlos and Carmelo.

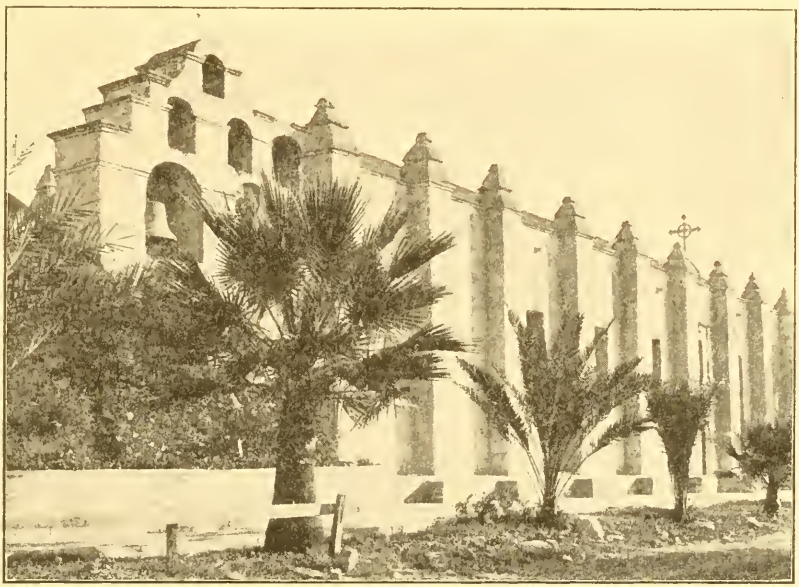
In volume II of "A Voyage 'Round the World," by J. F. G. De La Perouse, appears a very valuable and interesting description of mission life in 1786, during which year this noted traveler visited San Carlos mission. As he approached the mission establishment he was met by the president, who was clothed in his ceremonial habiliments. "Before we entered the church we passed through a square in which the Indians of both sexes were ranged in a line." Within the church were noticed pictures of hell and of paradise. The house of the missionaries, as well as the different storehouses, were opposite the church. The Indian village, consisting of about fifty huts, which served for seven hundred and forty persons of both sexes, stood on the right and were most wretched. La Perouse furnishes an entertaining description of the daily routine of mission life:

"The proselytes are collected by the sound of a bell; a missionary leads them to work, to the church, and to all their exercises. The day consists in general of seven hours labor and two hours prayer; but there are four or five hours prayer on Sundays and festivals, which are entirely consecrated to rest and divine worship. The Indians, as well as the missionaries, rise with the sun, and immediately go to prayers, which last for an hour. During this time three large boilers are set on the fire for cooking a kind of soup, made of barley meal, the grain of which has been roasted previous to its being ground. It is called atole. They eat it without either butter or salt. Each hut sends for the allowance of all its inhabitants in a bowl made of the bark of a tree."

San Carlos mission has been "restored," a peaked shingle roof destroying the original beautiful lines of the chapel. Within the church rest the remains of President Junipero Serra, but it was not until 1882

that his resting-place was definitely located and suitably inscribed. In the vicinity of the chapel are a number of ruined walls.

One of the most beautiful and less frequently visited missions is located in Monterey County, twenty-six miles from King City. This is mission San Antonio de Padua, a most picturesque ruin, and formerly one of the most extensive of the mission establishments. For years it was neglected, with no one to stay the hand of the vandal. The mission stands alone, its crumbling walls and deserted buildings appearing as if untouched since the departure of the padres and neophytes years ago. In 1903 the California Historic Landmarks League began the work of restoration, but the funds at hand proved insufficient to complete the reroofing of the chapel, and for two winters the great adobe walls, six



SAN GABRIEL ARCANGEL, LOS ANGELES COUNTY.

feet in thickness, were exposed to the elements, much damage resulting. After great effort a few hundred dollars were raised in 1905 and work resumed, but with this small sum it was only possible to erect a permanent roof over the vestibule. Unfortunately, however, the earthquake of 1906 wrought great damage, completely demolishing the newly erected walls and seriously injuring other portions of the mission. Conditions were most discouraging and the officers of the league debated as to the advisability of further attempting to save this old landmark, but the determining factor was the knowledge that San Antonio was one of the last remaining missions in a condition to be restored, and that another winter's rains would leave it in a hopeless ruin. With funds received from the Grand Parlor of the Native Sons, in June, 1906, the rebuilding of the walls commenced, and the rains of the winter of 1906-7 found all but a section of the chapel walls protected by a permanent roof, which unfinished portion was completed before the winter of 1907-8.

Mission San Gabriel Arcangel (the Archangel Gabriel) is located about ten miles from Los Angeles and is one of the most frequently visited of the missions. The chapel alone remains and is in good state of repair. San Gabriel was one of the richest of the missions, possessing at one period a hundred thousand head of cattle, besides horses, mules and sheep. The extensive gardens produced oranges, citrons, pears, figs and grapes in abundance. From four hundred to six hundred barrels of wine were made annually. As an example of the skill of the Indian neophytes, under their able instructors, we are told that one of the first vessels launched in California, a schooner of about sixty tons, was framed at San Gabriel and fitted for subsequent completion at San Pedro. Every stick of timber, after being hewn and fitted, was brought down to the beach upon carts, a distance of over thirty miles.

San Luis Obispo was the fifth mission, and was founded in 1772. Its present appearance is disappointing, for a modern church steeple has been added, removing, as has well been stated, every vestige of the days of long ago. It was at this mission that the use of tiles for roofing was first adopted, frequent fires having demonstrated the uselessness of thatched tule roofs.

San Francisco de Asis (Dolores) mission was founded in the memorable year 1776. The name Dolores was derived from the lagoon Dolores, upon the banks of which the mission was located—a lagoon which has long since disappeared. The buildings of Dolores mission formed two sides of a square without any apparent intention of completing the quadrangle. There were buildings for melting tallow and for making soap; smith shops, carpenter shops, and magazines for storing tallow, etc., Kotzebue speaks of the church orchestra he heard when he visited this mission in 1812, which consisted of a violoncello, a violin and two flutes; these instruments were played by little half-naked Indians who were very often out of tune.

The most beautiful of the old mission churches was the chapel of San Juan Capistrano (St. John Capistran). This imposing edifice was erected under the supervision of an imported master mason. It was built of stone and mortar, the stones not being hewn, but of regular size and shape. Over nine years were occupied in its building. It was cruciform in shape and was 146 feet in length by 28 feet in width. It has been stated that this structure could not be duplicated to-day, with a railroad at its doors to bring materials, for $100,000. It was surmounted by a bell tower 125 feet in height. This church was destroyed by a great earthquake in 1812, and was never rebuilt, ruins of the altar end still standing. This great temblor visited California on a Sunday morning, unfortunately, when mass was being celebrated beneath the vaulted roof of the great church, and forty were crushed to death. A number of the buildings of San Juan Capistrano still stand. The Southern California Landmarks Club has restored with tiles 387 feet in length of the principal building, and with gravel and asphalt an area of 5,250 square feet of corridors. It has buttressed the crumbling stone pillars which support all that is left of the great church.

While the exterior of Santa Clara mission is quite modern, painstaking effort has been put forth to have the interior of the modern chapel conform to the old. This is particularly true of the decorated

ceiling above the sanctuary, each board in the old ceiling having been carefully taken down, numbered, and later made use of in the new church. A portion of the sanctuary rail was made from the beams of the old chapel. The old adobe walls still constitute a part of the building adjoining the chapel and opening into the patio. Many interesting and valuable mission relics are carefully preserved in a room set aside for this purpose.

The two links to be next added to the chain of missions were within the present cities of Ventura and Santa Barbara. The first, San Buenaventura, was founded in 1782; the second, Santa Barbara, in 1786. Civilization knocks at the very doors of both these establish-

SAN LUIS REY, SAN DIEGO COUNTY.

ments. Business houses surround the mission at Ventura, and an electric car line terminates at the threshold of the best preserved and most widely known of the California missions, lying in the foothills of Santa Barbara. When Santa Barbara mission flourished there were within the enclosing walls two hundred and fifty adobe buildings.

La Purisima Concepcion (the Immaculate Conception), fast being despoiled by the elements, is near Lompoc, Santa Barbara County. Steps are now being taken to restore the one remaining building.

Santa Cruz (Holy Cross) mission exists only in memory, but a flourishing city bears the name of this former mission by the sea.

Soledad mission, or more properly, Neustra Senora de Soledad (Our Lady of Solitude), with its few crumbling walls, pleads more eloquently the cause of restoration than the power of words. These ruins are within the present county of Monterey, several miles from the town of Soledad.

The two missions which followed, San Jose de Guadalupe and San Juan Bautista, are not frequently visited, located as they are some miles from the railroad. Nevertheless, they are well worth a visit, particularly the latter, situated within the quaint old town of San Juan, in San Benito County.

Poor old mission San Jose! Formerly one of the most flourishing, little now remains to recall its past glory. The chapel has disappeared, a single, but picturesque, adobe building remaining.

A modern church steeple was years ago added to San Juan Bautista's chapel, but even the elements rebelled. A furious gale one winter's night leveled this hideous addition, the remainder of the mission escaping unharmed. The well-cared-for garden at San Juan, its beautiful arches and numerous relics, are attractive features.

From the car windows on the Southern Pacific coast road between San Francisco and Los Angeles, a view is had of San Miguel mission. The exterior is plain, but the interior most interesting.

With the exception of San Antonio mission, San Fernando Rey de Espana, twenty miles north of Los Angeles, is one of the most interesting, owing to its untouched state of decay and the acres of surrounding ruins. The Southern California Landmarks Club has reroofed the chapel and monastery of San Fernando.

The most prosperous of all the missions, and one of the most imposing architecturally, was San Luis Rey de Francia, four miles east of Oceanside, in San Diego County, a small station on the line of the Santa Fe railroad. This mission contained at one time 2,869 neophytes, nearly one thousand more than any other mission. An idea of the extent of this mission can best be gained by quoting from Alfred Robinson, an early American traveler and writer, who visited the establishment in 1829. He states: "The buildings occupied the sides of a large area, eighty or ninety yards square, in the center of which was a fountain with a constant supply of pure fresh water. The buildings around this court were divided into separate apartments for the missionaries, major domos, storerooms, workshops, hospital, and rooms for unmarried females. There was also a guard house and storehouses for the grain." To-day the imposing church is all that remains, with the exception of the beautiful arches, the original number of which was thirty-two, which were ornamented with latticed railings. These arches supported the long corridor, back of which was the square inclosure, or patio, mentioned by Robinson.

Three more missions were founded, and then the chain was complete, stretching from San Diego to Sonoma. Santa Inez, after Saint Agnes, was founded in 1804. It is located within the present county of Santa Barbara, twenty miles from Gaviota, a station on the Southern Pacific coast line. The chapel is free from architectural ornament. The monastery with its arched corridor still remains.

San Rafael Arcangel, like Santa Cruz mission, has disappeared, its location being within the present town of San Rafael, in Marin County.

San Francisco de Solano, the last to be founded, never enjoyed great prosperity. This mission is within the present historic old town of Sonoma. The remaining buildings belonging to this mission, not being the property of the church, were recently purchased with a portion of

a landmarks fund raised by a San Francisco newspaper, and have been turned over to the State of California. The date of founding was 1823.

It is difficult at this present day to fully realize the vast extent of the mission establishments when they were in their zenith. Each mission was practically a city by itself, and not merely, as many now imagine, a church within which the Indians received religious instruction. The maximum number of neophytes at the least prosperous of the missions, Santa Cruz, was 523; at the most prosperous of the establishments, San Luis Rey, 2,869; the average for the twenty-one missions being over 1,300, a total of nearly 28,000, between 1800 and 1830, the golden age of the missions. These untutored savages were trained in all the handicrafts necessary for a self-supporting community.

When in 1834 the robbery of the missions commenced, known under

SAN ANTONIO DE PADUA, MONTEREY COUNTY.

the diplomatic term of secularization, their downfall was rapid. They were sold for beggarly sums and the vast tracts of land confiscated. In a number of instances these sales were later set aside by the United States Government, when California came into its possession, and the majority of the remaining missions are still the property of the Catholic Church.

The Franciscan missionaries were the original pioneers of California, sowing the first seeds of civilization, establishing the first permanent settlements in Alta California, and enduring hardships almost beyond human comprehension. In restoring the missions, Californians are not alone paying deserved honor to the sacred memories of those devoted padres, but are preserving the most imposing landmarks, both historically and architecturally, that exist within the United States.

CALIFORNIA'S CALL TO THE IMMIGRANT.

By JOHN P. IRISH.

It is not pretended that California supplies any specific from the wealth of her soil and sunshine that will cure unthrift, bad judgment, and lack of faculty, or make of the do-less a doer. But there is legitimate basis for the belief that here the average man may work in greater comfort more days in the year, and earn his bread easier, than under the conditions that prevail in any other state or country.

California is a winterless land. No deep frosts chill the ground; vine and fig tree do not have to thaw out as a preliminary to going into business as fruit-bearers. All stone fruits, and the fig, pomegranate, orange, lemon, lime, pear, and apple are precocious bearers. The peach will bloom the second year from the pit. On the Mediterranean the olive fruits meagerly at seventeen years of age; here it bears a full crop at seven. In the East he must be a young man who plants a tree expecting to repose in its shade or to eat its fruit. Here old men may plant, and surely expect to enjoy the results. The growth of animals is not checked here by the withering winter, and a yearling horse is the equal of any Eastern two-year-old.

But, it may be asked, is not this precocity of animate and inanimate life compensated by early decay? The answer is, No. That rule has here its exception. The peach tree that blooms before the shell of the pit that bore it is decayed, bears on for thirty years, or more. Olive trees that furnished oil for the sacraments of the old Mission Fathers a hundred years ago, shade the graves of the gardeners who planted them, and ripen their yearly crop with unabated energy.

But men fail in California? Yes. Men who buy land and hire it planted and worked, running it on the absentee landlord system, fail here and everywhere. So do men fail who run manufactures and trade on the same system. But men who take here only so much land as they have the means and the ability to conserve, and can properly till and tend with the labor of their own families, do not fail; for here Nature helps the industrious hand, and nowhere else does intelligent labor add as much to the value of the land, for the reason that here Nature holds one handle of the plow.

The advantage that California has in climate where growth and production go on without pause is seen when the farmer finds his vines and trees, fields and truck-patch, producing something for the market every month in the year.

What effect does the climate have on the cost of living? Where the pastures yield natural forage, green or dry, every day; where the water never freezes; where vegetable growth goes on forever, and the storage of vegetables for winter use is never necessary, because they are growing and fresh daily, it is natural that the cost of living should be less than where the summer and fall are spent in hard labor to store food and fuel against the long winter that suspends production. Beef and mutton from the ranges; fish from the waters; fruits and vegetables reach market here in a condition for use more cheaply than elsewhere.

The economic value of climate should be considered in selecting a home: first, in respect to the health of the family, and, second, in respect to the number of days yearly in which your vocation may be followed. California, it may be said, has no endemic diseases. Except in the high Sierra mountains the snow does not impede outdoor occupation. There are no tornadoes or chilling blasts, nor are there any sudden changes in temperature which imperil life. The heat in the valleys, though high as indicated by the thermometer, is not excessive enough to prevent labor in the fields on the hottest days; because the air being dry, the latent heat of the body is rapidly eliminated, and the blood is kept cool. It will bear repetition that every day in the year is a working day. It follows that it costs less to live in California than in any other state in the Union, and the comfort of life is greater.

The intending settler should fix firmly in his mind the topography of California. We have a winter season called "wet," and a summer season called "dry." In the winter months the average rainfall is about twenty-five inches, distributed through four months of the year, and this is ample to insure abundant crops. California is 850 miles long. Her coast line extends as far as from Boston to Savannah. At the same altitude the climate is practically the same in the north as in the south of the State; hence San Diego in the south and the country 600 miles to the north produce identically the same crops. On the west slope of the Sierra Nevada Mountains, at an elevation of from 400 to 1,000 feet, is the famous foothill warm belt, stretching from Shasta to Kern County, and noted for the superiority of its fruits, including the fig, orange, lemon, and olive.

There is one great valley; its south end rests on the Tehachapi mountains, and its north end is lifted up by Mount Shasta. This great trough sags in the middle, and the rivers that run from each end escape into San Francisco Bay through a common delta. From these rivers we name each end of the valley, thus giving the impression that there are two valleys. The north end of the valley is the valley of the Sacramento, with an area of 4,000,000 acres. The south end is the valley of the San Joaquin, with 7,000,000 acres. This valley is the seat of wheat and raisin culture. On the west of this great valley rises the Coast Range, in which lie a number of fertile and extensive valleys, such as Santa Maria, Sonoma, Santa Clara, Vaca, and Suisun. In most of these fruit growing is the principal industry. The slopes of the Coast Range toward the sea and the high Sierras, are favorable for dairying. To some extent, therefore, the settler is guided in the selection of his residence by the business he desires to pursue.

We expend annually over $7,000,000 for the maintenance of our public schools. The State is entirely out of debt. The financial report shows that the State debt is about $2,500,000, but this is only a form of statement. There is that amount of State bonds, but the bonds are owned by the State and are covered into the state school fund. The State pays the interest to the state school fund, which is annually apportioned to the public schools. If California has a reputation for public extravagance it is undeserved, and the intending immigrant need not hesitate for fear his interests will suffer by reason of high taxation, due to the waste of public money.

It is not given to all men to be wealthy; but every original fortune in this country was founded in some man's determination to make a living and provide for life's decline when labor is impossible. Immigration flows where a living may be made under the most favorable conditions. The variety of resources in California invites an equal variety of tastes, training, and experience. If a man desires to mine, along the western flank of the Sierra Nevada Mountains for 800 miles is the world's greatest gold field. It has already yielded $1,000,000,000 from the merest scratching of its surface.

Horticulture here rises to the rank of a profession. Our soil and climate are so adapted to it that fruits from every zone may be grown. The clemency of our climate and its halcyon quality invite enterprise and ingenuity to experiment in all horticultural refinements. No equal area of the earth's surface has produced profitably a variety of the fruits of tree, vine, and shrub equal to that of California.

The beginning of all successful manufacture is in the transmutation of the most abundant raw material into more merchantable or more permanent forms for transportation and use at a distance. The State is not yet sufficiently supplied with plants for drying and canning our surplus fruits, or for reducing them to fine jellies, jams, pickles, pastes, etc. Immigrants who have a taste for these arts will find here a growing field.

No place presents better facilities for variety farming as it is practiced in the Mississippi Valley. With a small tract of land which may be cared for by the labor of an ordinary family, with some orchard or vineyard bordered with almond and English walnut trees, producing some alfalfa and grain, and carrying some cows, pigs, and chickens, the owner will find something produced for market every day in the year, while his family living will nearly all come direct from the soil he tills.

The reader will find the subjects herein generalized treated in greater detail in other chapters of this book. The treatment is conservative, and is intended to invite that careful personal examination which the prudent man makes who desires to better his condition by changing his abode.